Chemical Week-

September 21, 1957
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Pushing the Seaway to completion.
CHILA scans its progress, assesses future impact on CPI p. 39

tion do you measure up? Survey that chemical firms make aboveavants executive demands. p. 77

Political study clears Houston air, understores effectiveness of southel measures p. 107

Full dell debuts for industry: device to make electricity from changeds finds first use . . p. 119



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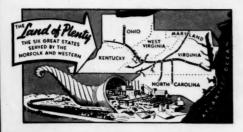
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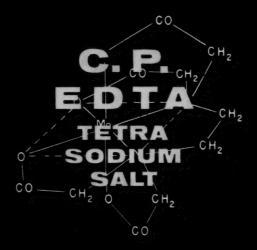
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TOP OF THE WEEK

September 21, 1957

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 —that's what researchers are saying
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Chemical Week (including Chemical Specialities and Chemical Industries) is published weekly by McGraw-Hill Publishing Co., Inc., 339 W. 42nd St., New York 36, N.Y. Printed in U.S.A. Second-class mail privileges authorized at Philadelphia. Pa. © Copyright 1979 by McGraw-Hill Publishing Co., Inc. All rights reserved, Subscription: \$3/year in U.S.A., U.S. Poscessions; 45 Canada 415 ather Western Hemisphere countries; 325, all other countries, lais see p. 26.

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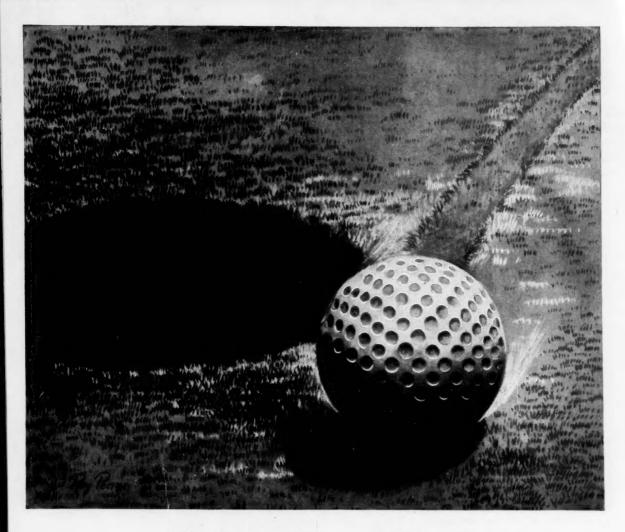
Zinc Fluoride

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Precipitation of Carbonates — Carbon dioxide in its gaseous form is used to

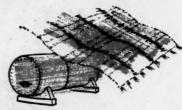
precipitate carbonates from water solutions. Ammonium bicarbonate and lead carbonate are examples. Bakeries and plastics manufacturers are among the many users of ammonium bicarbonate.



Simplifies Pulverizing of Materials With Low Melting Point-Many substances tend to melt or smear because of the heat generated in a milling process. DDT and vegetable fat flakes which are waxy and Teflon resin which is very tough and elastic are examples. In the low temperature pulverizing process the ingredient is mixed with crushed dry ice or low pressure carbon dioxide liquid is injected directly into the ingredient. These methods effectively inhibit the melting or smearing, prevents plugging and reduces horse power requirements. Gaseous carbon dioxide is also used to form an atmospheric "blanket" to effectively prevent fire during the grinding of flammable materials. An example of this application is the grinding of phosphorus pentasulphide and flammable resin materials.



Phenol — Phenol is a toxic, corrosive, flammable compound and is stored in an inert atmosphere under slight pressure to reduce vaporization, prevent oxidation and at the same time provide a non-flammable atmosphere. Carbon dioxide is also used as a pressure medium in transferring liquid phenol.



Effective Inerting Agent—There are many times when an inert atmosphere is needed to prevent fire or explosion. Before welding a tank that has been used for the storage of flammable liquid, CO₂ is used to inert the atmosphere in the tank so that welding can be done with no danger of explosion. CO₂, acting as an effective atmospheric "blanket," also prevents oxidation and "skinning" of paints and oils.

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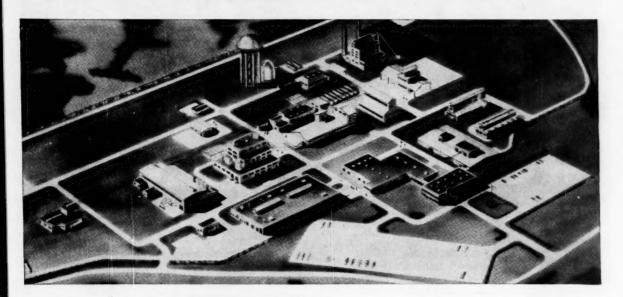
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Fig. 2337-Stainless Steel Gate Valve for 200 Pounds W.P. Screwed-in Bonnet. Inside Screw, Non-rising Stem.

> Fig. 1847-Small Stainless Steel Swing Check Valve for 200 Pounds W.P.



Fig. 2491-Stainless Steel O.S.& Y. Gate Valve for 150 Pounds W.P.

Fig. 2107-Stainless Steel "Y" Valve for 150 Pounds W.P. Outside Screw Rising Stem and Yoke.

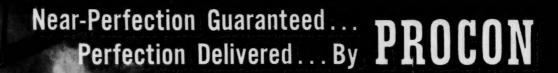


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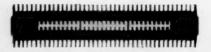
MANUFACTURERS SINCE 1883
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Cut-away view of Model 2000 GRID Unit Heater . . . note double steam chambers in each fin section and wide fin spacing . . . fins are cast integral with steam chamber.



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HOW ABOUT SOLUBILITY?-LAH is soluble in diethyl ether and tetrahydrofuran.

IS IT EASY AND SAFE TO USE?-LAH reacts swiftly, surely with standard techniques in conventional equipment. Reductions can be carried out at room temperature and atmosphere. Reduction temperatures range from -80°C to +100°C, depending upon the solvent used.

WHAT ARE SOME TYPICAL REACTIONS?—Here is a partial list of reactions which have proven of wide interest:

LiAlH.

tion of Aromatic Nitro Ester:

Reduction Aliphatic Nitro Esters:

$$\begin{array}{c} O \\ CH_3CH \cdot (CH_2)_2 \overset{\bullet}{C} \cdot OMe \xrightarrow{\text{LiAlH}_4} & CH_3CH(CH_2)_3OH \\ & & & & & & & \\ NO_2 & & & & & & \\ NO_2 & & & & & & \\ \text{Reduction Acetylenic Compounds:} & & & & & \\ OH & & & & & & \\ OH & & & & & & \\ \end{array}$$

Journal of the Chemical Society JACS 1854-60 (1954)

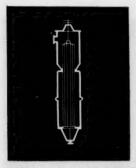
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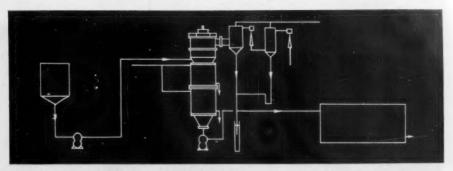
to your specific questions about Lithium Aluminum Hydride.

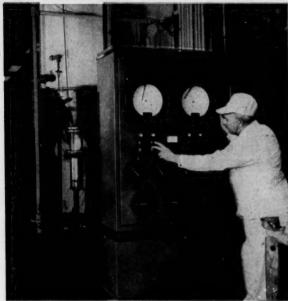
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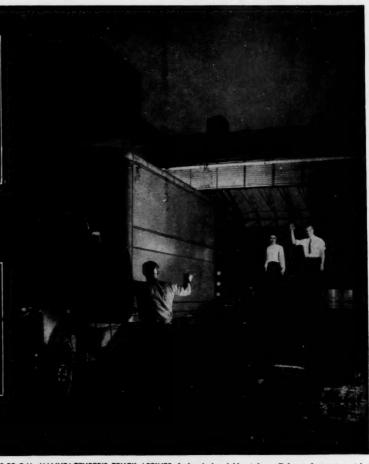
SERVING THE CHEMICAL AND PROCESSING INDUSTRIES WITH EQUIPMENT AND ENGINEERING



INVENTORY ERROR threatens to halt production at the plant of a large manufacturer in Wisconsin. Unless supplies of two critically needed chemicals are delivered by early evening the second shift will have to be sent home. A long distance call is put through to Merchants' Milwaukee office.



MERCHANTS' WAREHOUSE has been closed for half an hour when the call comes in, but two of the Merchants sales staff volunteer to stay late to help meet the emergency. They load sixty bags and two drums of chemicals onto trucks and flats, ready for pick-up.



AT 8:00 P.M. MANUFACTURER'S TRUCK ARRIVES, is loaded quickly, takes off for a fast return trip. Dinner was late that night for the two Merchants men, but they had been able to help a customer out of a tight spot. That kind of customer service is a tradition at Merchants Chemical.

THEY WERE READY TO SEND THE SECOND SHIFT HOME, UNTIL... Merchants' Service solved critical supply problem

A distributor, chemical or otherwise, sells service. At Merchants Chemical, service may take the form of emergency accommodation, as in the example cited above; or it may mean experienced technical advice, or special repackaging to help meet a particular production problem. Whatever your need, you'll find that

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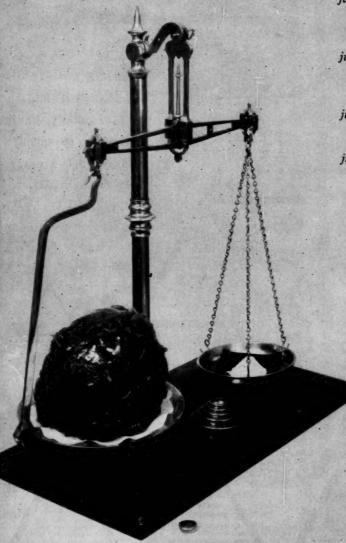
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7

THE THINGS YOU CAN DO WITH A LITTLE LITHIUM



just one pound of lithium hydroxide is all that's needed to make one hundred pounds of multi-purpose grease.

just one pound of finely divided metallic lithium is catalyst enough for one thousand pounds of synthetic rubber.

just one pound of metallic lithium degasifies one thousand pounds of molten copper.

just one pound of lithium hydride releases fifty cubic feet of hydrogen.

It's not so much the things you can do with lithium . . . as it is how little lithium you need to do them. Present day industrial applications require such small quantities of the metal that today's proven reserves are more than adequate to take care of all foreseeable needs. And even if lithium uses expand faster than their present amazing rate, it's reassuring to note that Foote Mineral, with the largest operating deposits in the United States, is still proving new reserves every day.

If you're interested in how a little of the right lithium chemical might go a long way in improving your operations, we'll be happy to discuss lithium chemistry with you at your convenience. Or, write now for a brief working rundown in "The Physical and Chemical Properties of Lithium Compounds" to Foote Mineral Company, 460 Eighteen West Chelten Building, Philadelphia 44, Penna.



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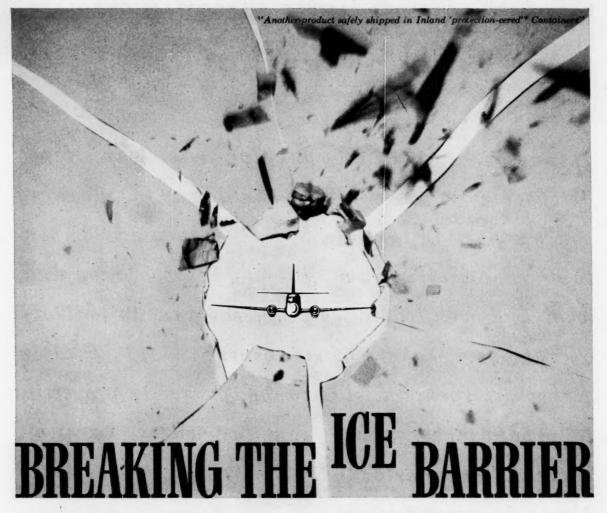
These are examples of the kind of problem Nopco's research men tackle...with a remarkable proportion of successes. It is always possible that they have recently solved your most critical problem. In any event, why not give them a try at it? They'll do their best to give you a practical, profitable answer-soon. Just write Technical Research Dept., Nopco Chemical Company, Harrison, N. J.



PLANTS: Harrison, N. J. . Cedartown, Ga. . Richmond, Calif. . London, Canada

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For complete Information see Chemical Materials Catalogue—Pages 373-376



Ice on airliner wings is dangerous. To eliminate this hazard, Kilfrost TKS R328 wing de-icing fluid, made by Chipman Chemical Co., Inc., is extensively used for both commercial and private airplanes. The fluid is circulated through a honeycomb surface along the wing's leading edge. The flow of Kilfrost over the wing's surface, controlled by the pilot, forms a film that dissolves ice on contact—preventing its formation in flight.

Foreign particles in this fluid, however, could clog the honeycombed surface, jamming the circulatory system. Kilfrost has to be delivered in perfect condition, pure and contamination-free.

Various types of packaging materials were tried but the abuse received during shipment caused leaks at corners and seams. So Chipman and Inland made exhaustive tests and found the answer in a sturdy Inland steel pail with a special protective lining. Now Chipman has a package they can depend on to deliver Kilfrost safe, uncontaminated, ready to break the ice barrier.

Wherever your products are used—land, sea or air—if packaging is a problem, Inland Steel Container is ready to help you. Write Bob Boecher, Dept. 334A.



*the right container, with the right lining for your product

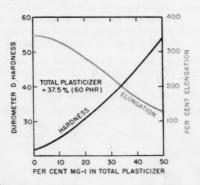
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- gaskets
- and other products that require hard vinyl plastics made by plastisol techniques.

Here's why! Monomer MG-1 is a high-boiling, low viscosity dispersant for polyvinyl chloride resins. Fluid plastisols are prepared with MG-1 in combination with conventional plasticizers. MG-1 polymerizes during the normal plastisol fusion cycle to produce hard plastics. The concentration of MG-1 controls the flexibility or rigidity of the finished product. This graph shows the effect of MG-1 on plastisol films.



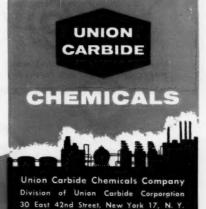
Plastisol fabricated vinyls made with Monomer MG-1 also have these outstanding properties:

- improved oil extraction resistance
- · reduced "rub-off"
- improved electrical properties
- · reduced volatile loss
- increased gloss
- improved scuff resistance

U. S. Patent 2,618,621 covers the use of Monomer MG-1 in vinyl chloride dispersions. This patent is now being licensed by UNION CARBIDE.

If plastisol fabrication is your business, Monomer MG-1 may open new markets for you. Write for technical data, samples, and licensing information. Address Union Carbide Chemicals Company, Department B, 30 East 42nd Street, New York 17, New York. In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Toronto.

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- -ideal for precision grinding of hard alloys
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Reynolds Calcined Aluminas are prepared from aluminum hydroxide, heated at between 1100° C and 1300° C. Calcined Alumina, a high purity compound produced in a combination Bayer-Sinter process, has only minimum traces of oxides of iron, silicon and titanium. Careful quality control and large volume production assures a high degree of purity and uniformity.

Chemical Specifications

TYPICAL CHEMICAL PROPERTIES OF R-2003 CALCINED ALUMINA (Analysis in Percent on Dry Basis)

Grade	Al ₂ O ₂	Na ₂ O	Si O2	Fe ₂ O ₈	*Total Water	
R-2001	99.1	0.40	0.035	0.020	0.5	
R-2003	99.1	0.40	0.035	0.020	0.3	

TYPICAL SIEVE ANALYSIS—R-2001 AND R-2003 (Cumulative Analyses in Percent)

Particle Size	en	Thru	
Classification	200 Mesh	325 Mesh	
Medium	40 to 80	0 to 10	

SPECIFICATIONS FOR SHIPMENT (Analyses in Percent on Dry Basis)

Grade	Na ₂ O (Max.)	SiO2 (Max.)	Fe ₂ O ₂ (Max.)	Total H ₂ O* (Max.)		
R-2001	0.50	0.04	0.03	2.5		
R-2003	0.50	0.04	0.03	0.5		

*Total water refers to the total of that actually present plus that which could possibly be adsorbed in an atmosphere 50% saturated with moisture.

Low, controlled udsorbtion is one of the most important characteristics of R-2003 Calcined Alumina. Because it will adsorb only trace quantities of water, shrinkage is less than that of aluminas produced at lower temperatures. Distortion of the finished product is at a minimum because there is less water to escape, and because about 90% of the alumina in R-2003 is crystalline alpha alumina. Re-crystallization is minimized.

R-2003 Calcined Alumina is also highly resistant to shock—both thermal and mechanical, and will impart this characteristic to the finished products.

R-2003 can be ground to its ultimate particle size less than 10 microns—with low dust losses. Thus, it dissolves quickly, with less power consumption, in electric furnace operations. Best Applications of R-2003 Calcined Aluminas: Abrasives—R-2003 is treated to the hardest form of alumina, corundum, with a hardness of nine on the Mohs scale. The resulting abrasive is ideal for cool precision grinding of hard metal alloys.

Refractories — Where resistance to extremely high temperatures is important, R-2003 fills a vital function, both in production equipment and final product. Replacing more expensive and scarce compounds, R-2003 adds refractoriness to tank and furnace linings for glass production. Toughness is added to the final product in almost direct proportion.

Glass – The toughest, hardest glass, with high luster — such as cookware, table crystal, drug ampules — contains alumina, often R-2003. Alumina improves the luster of glass, makes it more resistant to chemical attack, mechanical and thermal shock.

Polishing, Buffing—Calcined Aluminas are used extensively in compounds to polish stainless steels and hard alloys, as well as softer metals.

Laboratory Ware—Calcined alumina makes crucibles, kiln furniture, laboratory glassware and other laboratory equipment resistant to chemical attack, usable with high temperatures. It is also used for insulator bodies, ceramic glazes, tile bodies and saggers.

Grinding Balls – Dense, hard grinding balls are made from R-2003 Calcined Alumina. These are ideal for tough grinding requirements of the chemical and paint industries.

Shipping: Calcined Alumina weighs about 60 lb. per cu. ft. packed, about 47 lbs. per cu. ft. loose. Real density is about 3.8. Reynolds R-2003 is available in bulk shipments of 40,000 lb. minimum, in 100 lb. bags, or in 18 gauge 350 lb. steel drums.

Complete research and engineering service is available from Reynolds Metals Company to help you with problems in design, engineering, production or shipping. You can obtain samples and data sheets on Alumina Hydrates, Calcined Aluminas, Aluminum Dross and Aluminum Powders from the Reynolds office nearest you, or by writing to Reynolds Metals Company, P.O. Box 1800-CM, Louisville 1, Kentucky.

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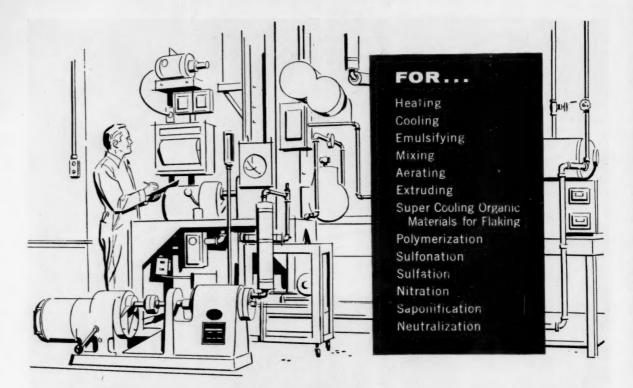
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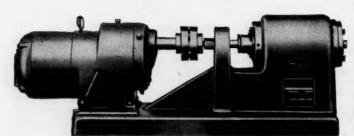


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OPINION

Pennsalt Sales Up

To the Editor: Several errors have been noted in your report on sales and earnings (Aug. 10): Pennsalt's sales of \$40.8 million reported for the first six months were actually up 9.9% instead of down that amount; net profits of \$2 million were down 8.9% instead of 9.8% as reported; and sales of \$21.7 million for the second quarter were up 9.2% instead of down....

While the correction of these errors will not materially alter the reported industry trend toward higher sales and lower earnings, a corrected report might lessen the disappointment of those of us who had hoped that company earnings might be somewhat higher in spite of large nonrecurring expenses incident to the expansion of our facilities. . . .

W. AUSTIN BISHOP Manager of Public Relations Pennsalt Chemicals Corp. Philadelphia

We sincerely apologize for the erroneous minus sign on the sales trend and for making Pennsalt's profit dip deeper than it was.—ED.

Delaware Salinity

TO THE EDITOR: [Re] . . . misquoted values that were reported in "Industry Weathers Drought" (Aug. 24, p. 22).

What [we] said . . . was that for the period 1949-52 the Delaware River at Philadelphia had a maximum chloride concentration of 52 parts per million and a minimum concentration of 2.8 ppm. During this time, the river at Philadelphia averaged approximately

CW welcomes expression of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St, New York 36, NY. 12 ppm. Also, the value of 22 ppm. was given as the maximum concentration on July 23, 1957.

You may be interested to know that on Aug. 23 we made a profile study of salinity invasion in the Delaware River, and the concentration of chloride at Philadelphia was 80 ppm. In the absence of accidental causes or unusual phenomena causing high chlorides, the 80 ppm. chloride is our recorded high for the river at Philadelphia.

Phenomena such as hurricanes may contribute to abnormal river conditions, which may effect saline invasion at different locations. For example, the high wind velocity of hurricane Carol during late Aug. '54, along with other factors of tides and river level, contributed to a high chloride concentration of 115 ppm. at Philadelphia Sept. 1, '54. However, abnormal concentrations of mineral constituents in water resulting from a known accident or any unusual phenomena are noted but generally excluded from the values used for statistical evaluation of rivers and streams. . .

NORMAN H. BEAMER
District Chemist
Geological Survey
Philadelphia

40-Year Perspective

To the Editor: We were particularly interested to read your recent article, "Equipment Prices Will Be Going Up" (July 6).

To be sure, your included chart illustrates effectively the general similarity between the recent trends in (1) the price of steel, and (2) the cost of equipment, and substantiates our own conclusion as to the imminence of a new rise in equipment prices.

However, it is Mr. Breyer's confirmed opinion that a 40-year perspective is far more revealing than one obtained from examination of short-term trends.

In his opinion, a fuller significance of the interrelation between these two items can be obtained from the attached Singmaster & Breyer chart (S&B—40), which we have been issuing regularly for the last year or two.

You will note that only twice in the last 43 years has the cost of equipment dropped without being first pre-

ceded (or at least accompanied by) a drop in the price of steel. These were the nominal reductions indicated in 1925-26 and 1948-49. Furthermore, every rise in the price of steel, with the exception of the 1948-49 abnormality, has been accompanied by an upward movement in the cost of equipment.

The facts speak for themselves.

H. JACOBSON Singmaster & Breyer, Inc. 420 Lexington Ave. New York

Interested readers may request copies of the chart from Mr. Jacobson.—ED.

Add Flav-O-Lok

To the Editor: . . . You published an article (Aug. 3, p. 78) about the dry flavor series. We . . . are rather surprised that you did not mention "Flav-O-Lok" brand dry flavors manufactured by our company since Oct. '52.

Our associated company, Soflor Ltd. in England, manufactured these dry flavors earlier than this, and we have no hesitancy in claiming that we were among the first, if not the first, to come out with the spray-dry type of dry flavors. . . .

BERNARD POLAK
President
Polak's Frutal Works, Inc.
Middletown, N. Y.

In our story, we listed some typical brandnames, but we didn't imply that it was a complete list.—ED.

MEETINGS

Technical Assn. of Pulp and Paper Industry, engineering conference, Netherland Hilton Hotel, Cincinnati, Sept. 23-26.

National Plant Food Institute, New England fertilizer conference, Bald Peak Colony Club, Melvin Village, New Hampshire, Sept. 25.

American Oil Chemists' Society, 31st meeting, Netherland Hilton Hotel, Cincinnati, Sept. 30-Oct. 2.

Joint Military-Industry Packaging and Materials Handling Symposium; theme: packaging and materials handling in action; Fort Lee, Va., Oct. 1-3.





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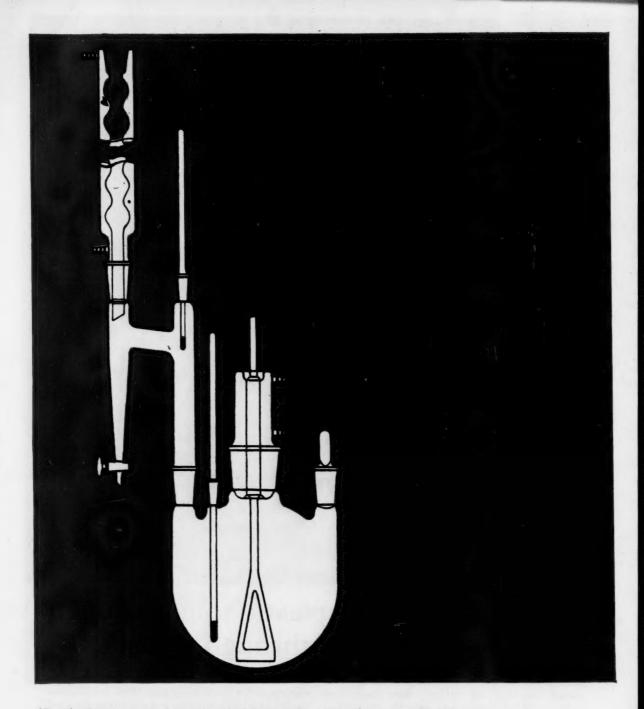
General Electric has developed a new plastic tough enough to replace cast metals in many applications. Called LEXAN® polycarbonate resin, the new thermoplastic has such high impact strength that parts molded of it can withstand hammer blows without breaking.

LEXAN resin has a hard, smooth surface and can be made in transparent and opaque colors. It resists heat and mechanical stress well, and has excellent electrical properties. In preliminary tests, LEXAN resin has shown promise in such applications as coil forms, structural and insulating parts, gears and appliance components. In many cases, one part molded of the new plastic is able to replace an assembly of several parts made from conventional materials.

LEXAN resin joins a growing list of G.E. chemical discoveries...a list that includes many of the new silicones, electrical insulating materials, and phenolic molding and coating resins. LEXAN resin is not yet available for field evaluation; the limited quantities now being produced are being used in a controlled testing program. For preliminary information on LEXAN resin, write Dept. CDD, CHEMICAL and METALLURGICAL DIVISION, General Electric Company, Pittsfield, Mass.

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The addition of the inhibitor protects the alcohols during the esterification process and minimizes color formation. In addition to improving the quality of the esters, the use of the inhibitor may also effect important economies in processing. In many cases it will be unnecessary to further decolorize the ester (with carbon black) to obtain a product with a very light color.

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Business

Newsletter

CHEMICAL WEEK
September 21, 1957

Closing of Amoco Chemicals' chemical-and-synthetic-gasoline plant—the Brownsville, Tex., unit Carthage Hydrocol opened first in 1950—in the next few months will mean the end of a major seven-year effort to make synthetic fuels and chemicals from natural gas. Terming the unit, originally built with the help of an \$18.5-million loan from Reconstruction Finance Corp., a "technical success but an economic disappointment," Amoco will begin laying off the plant's 800 workers Oct. 1.

"We have proved the technical soundness of the process," Amoco President Jay Forrester said, but "we have determined that [it] cannot make gasoline and chemicals from natural gas as cheaply as they can be made by other process. The units are more costly to operate and maintain than we had anticipated."

Aside from the layoff of 800 employees, the immediate effect of the closing will be to reduce Amoco's net 1957 earnings "about \$5 million." Partly offsetting this will be the elimination of current operating losses and the additional heavy capital expenditures that would be needed to try to make the plant economic. Of the several sections of the Brownsville layout—natural gas producing properties, the processing plant, a separation plant and storage facilities—Amoco will continue to operate only the gas producing portion.

The Brownsville plant has been plagued with trouble since its inception in '46. Carthage Hydrocol, jointly owned by nine companies, completed the unit in '50. It was scheduled to convert 90 million cu. ft. of gas and 280 million cu. ft. of air daily into 6,000 bbls. of gasoline, 900 bbls. of diesel fuel, 200 bbls. of fuel oil and 300,000 lbs. of chemicals (alcohols, acids, aldehydes, ketones). But the plant never reached more than 30% of capacity, and was shut down in June '53. It was turned.over to RFC. Then, in March '54, Stanolind Oil & Gas Co. purchased it and then changed the name of the operating corporation to Hidalgo Chemical, which was later consolidated into Amoco Chemicals Corp.

Pulp mill operators in Washington state got a setback last week when the state's pollution control commission denied permanent waste discharge permits to two big mills. Rayonier was denied a permit for its Shelton mill—which is currently closed because of "market conditions" (CW, July 27, p. 22)—and West Tacoma Newsprint Co. failed to get a permit for its Tacoma plant.

Though the denial of permission appears to be a follow-through in the pollution commission's "tough" policy, there's a possibility that the mills will receive temporary permits, such as those under which both have been operating at times in the past. But oyster growers, who have

Business

Newsletter

(Continued)

been most vocal in complaining about the alleged effect the mill wastes have on oyster beds, may persuade the commission to deny even the shortterm permit.

U.S. pharmaceutical firms should benefit from a policy switch by the British government. Britain's Ministry of Health last week decided to import Salk polio vaccine produced in the U.S. A short supply of a vaccine developed in Britain, coupled with Britain's near-record rate of polio, forced the move.

Glaxo Laboratories and Burroughs Wellcome, the only two companies making the British vaccine, have turned out only enough so far to vaccinate 1.5 million children. Britain, seeking to treat children up to 15 years old and all expectant mothers, will need 6 million to 14 million doses of Salk vaccine from the U.S. to supplement its own output.

Britain has hesitated to import the Salk vaccine because of some fear about its safety. For safety reasons, too, Britain has refused to import French-made Lepine vaccine. Although it will meet the current emergency with the Salk product, health officials plan to offer mothers this choice: Salk vaccine now—or the British-made product (which it terms the "safest and most effective" in the world) at a later date.

Dow Chemical has major expansion projects in the works. President Leland Doan told stockholders last week that Dow will spend more for expansion in the current fiscal year (ending in May '58) than the \$162 million it spent in fiscal '57. One of the new projects is a linear polyethylene plant slated for Bay City, Mich. (see Technology Newsletter, p. 103).

Another new water-thinned paint vehicle has made its bow. Reichhold Chemicals has launched its 1505 Synthemul, a high-gloss, water-thinned architectural (and industrial) finish. The new vehicle is an alkyd emulsion; it can be combined with vinyl acetate emulsions to improve color retention and speed of dry.

Nobody seems to want the Painesville, O., magnesium plant. The government got only two qualified bids—from Kaiser and International Quicksilver—both of which failed to meet specifications, so the auction fell through. A sale attempt using sealed bids had earlier ended in failure.

Explosion of an experimental Rocket engine kills one man and seriously injures six others at the Naval Air Rocket Test Station, Dover, N. J., this Monday. The dead man was Herbert Bell, of Chance-Vought Aircraft of Dallas. Two of the injured work for Reaction Motors of Denville, N. J. Reaction Motors made the engine that was being tested. The engine was reportedly not running at the time it exploded.



Up against a tough processing problem? Looking for ways to increase yield — improve efficiency — reduce costs? Try sodium.

This versatile, low cost metal can be used in so many ways as an agent in reducing, dehydrating, decolorizing, deodorizing; in polymerization, condensing and dehalogenating reactions. Sodium also acts as a nuclear heat transfer medium.

Can sodium be put to work for you?

As the world's largest producer of sodium, with plants at Baton Rouge, La., and Houston, Texas, our supply is ample and dependable. And in whatever form you need it — from cans to carloads.

You'll find our booklet, "Handling 'Ethyl' Sodium" interesting and profitable reading. Or one of our experienced Chemical Engineers will be glad to call and discuss possible applications in your plant. The coupon below is for your convenience.

CORPORATION

100 PARK AVENUE, NEW YORK 17, N. Y. CHICAGO • TULSA • LOS ANGELES

ETHYL

SODIUM

OWENS-ILLINOIS ASSURES YOU A COMPLETE PACKAGING APPROACH



Co-ordinated Research

Pure research into fabrication of glass, packaging research into processing and handling methods in customer plants, market research into consumer attitudes. All add up to greater packaging value.



Engineered Design

At Owens-Illinois, your package's three needs are taken into account: 1) Considerations of its function in the retail store, 2) its operating efficiency, and 3) its consumer utility.



The Right Container

Versatility of facilities and talents make O-I your best source of supply. In container development—beauty, utility, tradition are blended in the right proportions for your product's needs.



The Right Closure

Through long and continuing research O-I has developed the most advanced metal and plastic closures. Helping you choose the right closure is another function of O-I's packaging service.



Needed Fitments

O-I 'specialists are keenly aware of sales benefits derived from plastic shaker and pour-out fitments which are not "gadgets" but which increase consumer satisfaction with your product.



Merchandising Cartons

Modern cartons are developed only through systematic consideration of their opportunity to serve you in the retail store and warehouse . . . as well as on your own filling line and in transit.





New convenience for liquid products! New two-finger handle by O-I... makes largesize containers so much easier for the housewife to use.



Laundry products in glass are easy to hold, easy to use...and a glance shows how much is left.

Look at <u>all the freedom</u> glass brings to <u>washday</u> packaging!

In today's market, your laundry product needs every packaging advantage: a new user convenience—an edge in eye appeal—or even the smallest reduction in volume-cost.

That's the beauty of glass packaging—packaging free-dom! There are endless ways to improve your salespackage to make it work harder. Take, for example, these up-to-the-minute packaging ideas from Owens-Illinois.

The full-gallon jug. Ideal for volume items like liquid starch, where users are accustomed to buying for economy in big ½-gallon sizes. Users will appreciate the extra savings they get in the full-gallon jug. And it

means the advantage of more economy to you, too!

New two-finger handle. Gripped with two fingers, instead of one, economy sizes of liquid washday products seem so much lighter, far more convenient to use.

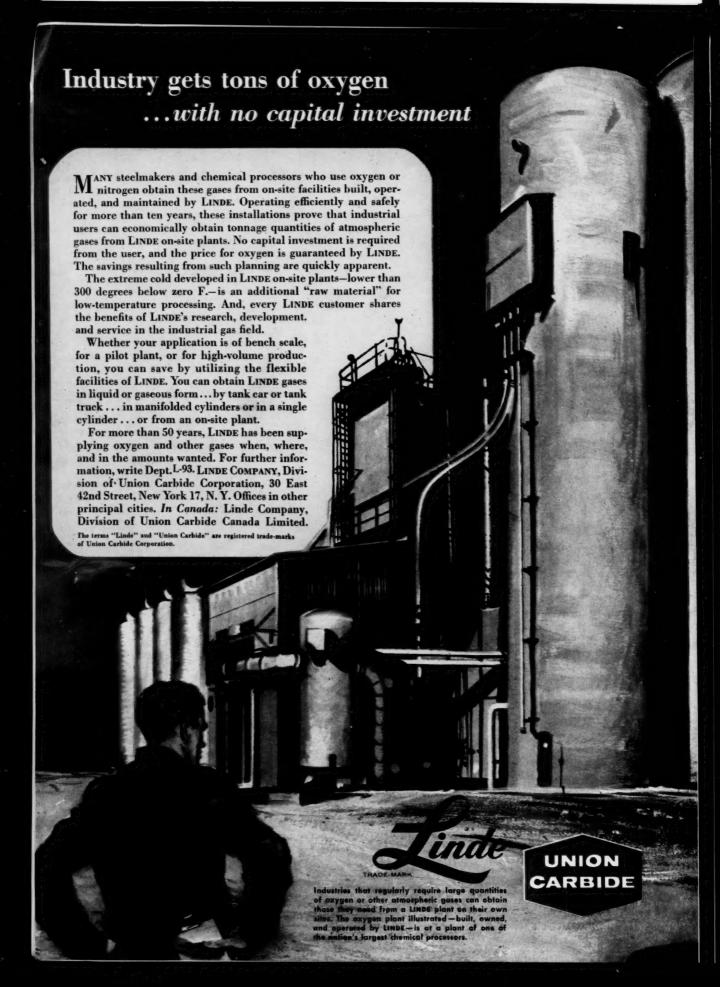
Bright, attractive ACL labels. Natural for premiumpriced washday products like special cold-water compounds for woolens. Glass labeled with bright, colorful ACL label makes an eyecatching salespackage.

So for washday packaging—make it glass! Remember Owens-Illinois is the marketing-minded supplier of the complete salespackage—from over-all design to selection of the right container, closure and fitment.

DURAGLAS CONTAINERS
AN (I) PRODUCT

Owens-Illinois

GENERAL OFFICES · TOLEDO 1, OHIO



Chemical Week



As construction crews work around-the-clock to complete its big dams and snaking canals, the St. Lawrence Seaway daily looms larger in the planning of the chemical process industries. An index of the CPI's growing occupation with the giant waterway was this week's Chemical Market Research Assn. meeting (at Lake Placid, N. Y.) devoted to an assessment of the seaway's future impact on chemical distribution, plant location, regional growth, imports and exports.

But there are other signs of preparation for the seaway's opening, scheduled for mid-1959. Dow is designing a pipeline to connect Midland with the Lake Huron port of Bay City, Mich. Dow also is planning lake-side facilities for package goods in the same town. Diamond Alkali is

moving ahead with its port installation on Lake Erie at Fairport Harbor, a few miles from the company's important Painesville, O., plant. And tanker brokers in New York are talking seriously about bulk maritime carriers for lard and vegetable oil.

This rising current of interest, however, must be qualified. For the immediate future, industry men see only limited direct benefit from the deepened (to 27 ft.) channels. That's because the present depth (14 ft.) and facilities are adequate for many purposes—and are already in use.

The long-term view is less restrained. Over the next several decades, the seaway is expected to stimulate significant growth in many chemical consuming industries, encourage population and industrial build-up of many inland areas. It is such growth that holds the greatest promise for chemicals and that may lure firms to seaway sites.

Export Alterations? Total U.S. chemical exports will not be greatly altered by the seaway. The reason, says Dow's manager of distribution development, H. G. Miller, is that coastal producers are already supplying to overseas buyers what inland producers cannot. But, he stresses. anticipated freight rate cuts will help Midwestern manufacturers crack the market. The edge-1/2-2¢/lb.-that Eastern Companies have on a typical package freight cargo (e.g., plastic resins) moving from Illinois might be pared 1/2-3/4 ¢/lb. The seaway should result in a moderate increase in shipments through U.S. and Canadian seaway ports, which now export-Miller guesses-some 60,000 tons of "general cargo" chemicals annually. Shipments, he adds, will be most practical to northern European, and to a lesser extent, Mediterranean and North African destinations.

Other inland producers appraise seaway exports in similarly cautious fashion. Wyandotte sees little advantage or disadvantage for its major export items: soda ash, caustic soda, chlorine. Diamond Alkali states that highly competitive overseas producers will smother any rate benefit the seaway would confer on its major exports. And cheaper Caribbean salt, contends Pennsalt International, precludes much help from the seaway for sodium chloride exports. Both Goodrich and Harshaw, too, foresee little

effect on their export product lines.

Import Incentives? The seaway, believes Canadian Industries Ltd.'s Douglas Walkington, will allow slightly lower prices for bulk imports, especially ores. On higher-priced chemicals, price differentials in favor of Great Lakes ports will be insignificant. There's a good possibility, he adds, that multi-compartment chemical tankers will eventually become a factor.

Alkali producers expect no difficulty from overseas competition—because foreign material isn't now competitive at Eastern ports. Petrochemical producers on the Gulf of Mexico aren't worried, either. And sulfur companies discount the impact of Canadian sulfur in major U. S. marketing areas. Mexican sulfur, they estimate, will call the price tune.

Canadian Outlook: CIL's development manager, B. J. Moriarty, feels the impact will be less than other influences shaping Canada's chemical boom. Others hold that a lesser gain will stem from the stabilizing effect of the seaway on freight rates.

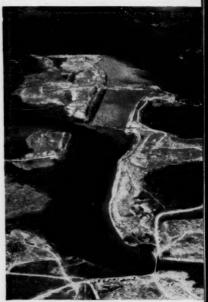
Du Pont of Canada will have to build terminal facilities before it can use the waterway. The firm envisions the day when it will want to bring cyclohexane from Texas to its nylon plant at Maitland, Ont. And transshipment of fluorspar for its Freon products may be avoided by use of the seaway.

On the whole, there's a chance that Canadian exports of synthetic rubber, polystyrene, cobalt oxides and salts, ethylene glycol and some other organics will be enhanced. Increased Canadian imports of organic and inorganic acids, some fertilizer lines, potash and phosphate rock, and raw materials for ore refining and protective coatings are a possibility.

European Prospects: All major British firms are studying the potential impact of the seaway opening. And although they hope it will help their North American export sales, none is making rash, optimistic predictions. There's a fairly general feeling that the seaway will prove ineffective in surmounting "the high tariff wall." Most European companies hesitate to make predictions.

Freight Rates: Responsible for much of the current vagueness in assessing the seaway's influence is the uncertainty about the ultimate freight

The Seaway's Long



STEP 1—DIVERTING RIVER
Problem of constructing the massive Long
Sault spillway dam lies in diverting river
channels from its natural path. Water flow-



STEP 3—RETURNING RIVER
Before remaining parts of dam can b
worked on, it is first necessary to reduc
the volume of water carried by the di

ault Dam . . . Its Construction Problems Were Typical



through the channel on the left must bypassed to the stream on the right. ferdam built across river will then keep bed dry.



STEP 2—STARTING ON DAM Water in the river channel has now been diverted and construction of the first part of the dam proceeds. When the edifice is

finished, it will extend across the stream shown here to link up with the southwest tip of Barnhart Island. The dam will tower 145 ft. above its foundation.



ed stream. This picture shows the died water being returned to its original. Another cofferdam will then hold flow while construction proceeds.

reduc

he di



STEP 4—FINISHING DAM Diversion route is filled; work continues on the final sections of dam. Spillway section is in the center, north bulkhead on

the right. When Long Sault and the accompanying St. Lawrence Powerdam are finished, about 2 million kw. of electrical energy will be available. rate structure. Tolls, for example, are still indefinite.

Capital expenditures and interest on the \$340-million project must, by law, be recovered within 50 years. That, and the seaway's annual operating costs and maintenance, according to reliable estimates, means that some \$28 million will have to be collected each year.

Ores, minerals and agricultural products (most probably, the bulk of seaway cargo) must, also by law, get preferential tolls; current speculation places such rates at around 40-50¢ a ton. Consequently, package and general cargo (which includes most bagged and drummed chemicals) will likely bear a much heavier levy. Lakeside chemical shippers figure that package cargo tolls will be about \$1-1.25/ton, somewhat less for bulk chemicals.

Railroads can be expected to lower rates to meet seaway competition. This could have an upward effect on tolls, because they must be set to meet the 50-year payout requirement. Moreover, the toll question is fast becoming a first-class political football. At the just-completed hearings in Washington that covered the guestion, Eastern railroads plugged for higher tolls, while Great Lakes shippers took the low-toll stand. And, at the same session, Seaway Development Corp. President Lewis Castle squelched hopes of those who want a toll-free seaway. He flatly stated that there will be tolls.

But it wouldn't surprise some observers to see a move in Congress next year to write off part of the U.S. seaway cost - \$140 million - as "essential to defense."

Bottlenecks: The economics of seaway chemical shipment must reflect other operating costs besides tolls. Waiting-time at passages, for example, will be important. That's because a serious bottleneck is expected to develop eventually at the Welland Canal, which permits only one-way traffic over part of its length.

Aggravating the problem: the seaway's limited (about 8 months/year) shipping season. That factor is likely to induce pileups during the peak shipping months. The restricted season, too, will necessitate inventory buildup, which, for some chemical lines, would make use of the seaway unattractive.

Port Problems: The fewer stops a seaway vessel needs to make to pick up or discharge cargo, the more economical its operation will be. As a result, sailings will be concentrated at such big ports as Chicago.

But many cities are priming for seaway traffic. Among them:

- · Rochester, where a study of port development prospects disclosed the lack of bulk chemical terminals, but pointed out that operators of such depots would likely set up shop if the city acquired and prepared suitable land areas. As an initial step, Rochester has zoned off such an area.
- · Chicago is now mulling over a \$38-million scheme that would add some 900,000 tons port capacity. Milwaukee, too, has an ambitious program planned.
 - · Cleveland, with one deepwater

pier already in operation, is planning another. Toledo, dredging out the Maumee River to 27 ft., is thinking of an independently operated \$1.5million cargo terminal.

· Ashtabula will soon sport two 2,-000-ft, piers with bulk facilities.

Summing Up the Seaway: Come what may, there's little doubt that the seaway will offer lower freight costs on bulk raw materials. But straight chemical traffic over the route will be dwarfed by shipments of iron ore, grain, coal, petroleum and minerals.

Although chemical firms will likely realize little initial gain from this deepwater channel from the lakes to the sea, benefits to the industry will eventually accrue—as the St. Lawrence Seaway makes a substantial impact on the U.S. and Canadian economies.



Big Smoke, But a Small Fire

Fire and explosion destroyed a pump room in Koppers Co.'s Kobuta chemical works (near Monaca, Pa.) last Thursday, setting off a volley of spectacular local reports on the "devastation." Koppers had plenty of help in coping with the three-hour blaze, says first reports were badly exaggerated.

The flames knocked out a minor

portion of the company's ethylbenzene equipment, brought 300 fire fighters to the scene. High-shooting flames caused most of the rumors.

No one was hurt; damage is estimated at \$100,000. The blaze was confined to a 150-sq.-ft. area in the 275acre unit. Koppers reports that tanks, buildings, and most equipment in the area appear to be in sound shape.



ACS employment center was busy during New York convention.

ACS Meets in Manhattan

Last week, 15,000 research-minded chemists descended upon New York City for the 132nd annual meeting of the American Chemical Society. And, while attendance was considered good at most scientific sessions, the big turnouts were standard for luncheons, alumni get-togethers, and field trips. Moreover, research took many forms—New York's sight-seeing business took a spurt while rubber-necking chemists viewed the city's landmarks.

Sightseeing boats and buses, the Statue of Liberty, Radio City Music Hall, the observation tower atop the Empire State Building—all were studded with the orange and white badges worn by registered ACS members. And many, particularly those who had brought their wives along, found that visits to New York's night spots helped top off an otherwise scholarly stay in the city.

Job Hunters: But knowledge and entertainment weren't the only goals of the visitors. Those looking for jobs found good hunting at ACS's employment clearing house, which occupied the entire second floor of New York's Board of Trade building. Bradford Stanerson, assistant secretary of ACS and director of the employment center, reported that 635 persons applied for job interviews. The number was about 25% higher

than at last year's Atlantic City meeting. One possible reason for the increase: the meeting location was a large city, not a resort area.

Surprisingly, Stanerson interprets the higher number of job interviews as meaning that more jobs are available—he does not credit a surplus of technical personnel. His reasoning: ACS has found a rough relationship between the number of jobs open and the number of interviews granted.

Says Stanerson, "It would seem, in the chemical industry at least, that there are more jobs to go around and that threats of employment cutbacks haven't materialized."

Besides this optimistic note for chemical management men, there was plenty to think about in research results described in the scientific papers presented at the meeting. In the pharmaceutical field, for example, Eli Lilly researchers told of synthesizing four new families of powerful tranquilizing drugs for use on "hopeless psychotic patients" (CW Technology Newsletter, Sept. 14).

As the week ended, members looked upon the meeting as one of the most successful in ACS's history. Attendance set new records, and the 1,500 papers that were presented posted chemists on progress in research, provided industry with new ideas for commercial development.

New Steroid Source

Reports this week of a new plant in Guatemala for processing dioscorea root could mean new importance for the root as a commercial raw material for diosgenin-based steroid compounds.

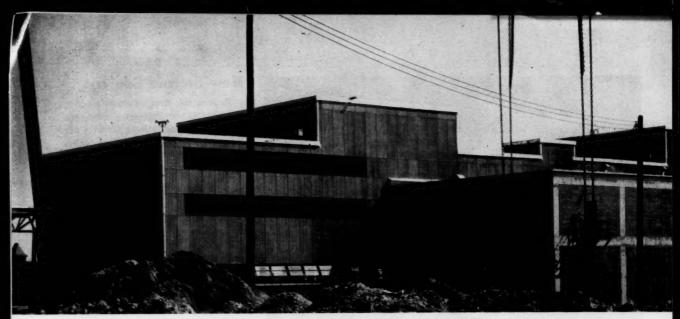
The root, known as dioscorea floribunda, was discovered in abundance there about two years ago by Percy Julian, president of Julian Laboratories. More than \$200,000 worth of it has been shipped to U.S. manufacturers. Now, according to late reports, plans are being made to set up a hormone-producing plant there. It will be financed by Guatemalan, U.S. and European interests.

Prime Mover: Prime exporter of the root, which is listed in export records as barbasco, is the Compania Agricola Industrial Guatemalteca SA (CAIGSA), which owns and operates a milling, fermenting, drying and packing plant in Guatemala City. CAIGSA airships the root in granular form in 25-lb. bags. Currently, Julian Laboratories gets all the diosgenin produced by the company. However, Ciba also imports dioscorea at its New Jersey plant through a Guatemalan agent.

The root is being exported at the rate of 60 to 100 metric tons/month. Thus far, no government controls over its export have been set up, a situation particularly attractive to U.S. drug firms that found their supplies curtailed by alleged Mexican government favoritism to certain barbasco exporters. Actually, several new diosgenin sources, among them the Guatemalan one, have been developed as alternatives to the Mexican source.

Plantation: CAIGSA is setting up an experimental plantation to cultivate the root. If this is successful, says manager Franz Ippisch, the problem of difficult transportation to and from the areas where the root grows wild may be overcome. This could foster a large industry.

Though aging characteristics and speed of growth of the dioscorea are not yet known, current estimates indicate that a 15-20-year supply of the root, at present demand, is available in Guatemala. Biggest drawback to an integrated industry there is the cost of importing processing equipment and chemicals.



Abbott Laboratories' new facility at North Chicago, part of a \$2.5-million expansion aimed at . . .

Building for More Bulk Chemical Sales

Abbott Laboratories last week installed the first of 30 new 1,000-gal. reactors, highlighting a \$2.5-million expansion in bulk chemicals—items that will play an increasingly larger role in Abbott's total sales picture.

Though bulk chemicals have been on Abbott's sales list for a decade, their prominence in the company's operations is just now showing up. Sales records show that while Abbott's over-all 1956 sales were 62% above those of '47 (when bulk chemical sales were first handled by a separate division), bulk chemical sales rose 474% over those in '47.

And so far this year, they're 98% above last year.

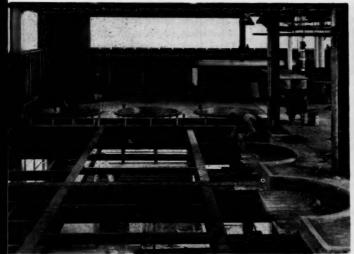
The Beginning: Ten years ago, Abbott's so-called bulk sales of fine chemicals were merely an effort to get rid of surplus stocks—those where purchases were slightly in excess of company needs. But management studied the picture, concluded that these products could profitably be made an adjunct to the company's line of ethical drugs.

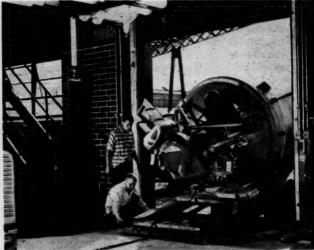
In addition to developing a sizable business in custom manufacture of pharmaceuticals, Abbott has nearly doubled the number of bulk chemical items that it makes and sells. It now has over 60 products on its list.

The sales staff for bulk chemicals is wholly separate from the staff that sells drugs. Not only does Abbott look for people who are not pharmacy school grads for this type of selling, but it also has some on its staff who have no technical training at all—thus highlighting another area where the nontechnical salesman may be valuable (CW, Aug. 10, p. 54). Of its 10-man sales staff, eight are salesmen, two, technical-service personnel.

And some of its products are sold by others. When Abbott's bulk chemi-

Engineers and craftsmen speed work to set reactor vessels in place, get production going by November.





Chemical Week • September 21, 1957

cal management team decided to make gibberellic acid, they also concluded that their present sales setup was not geared to sell this specialized product. As a result, Velsicol Chemical was chosen as sole sales agent for Abbott's gibberellic. The decision seems to have been a wise one; Abbott is about to increase its gibberellic acid capacity.

Spotlight on Sucaryl: Of the bulk chemicals that Abbott both makes and sells, its Sucaryl-brand cyclamate sweetener is the largest both in dollar volume and poundage. And this product has received the lion's share of the firm's bulk chemical promotion budget. Recently, the company began a four-color newspaper advertising campaign directed to the general public. Special feature: the ad includes listings of local soft-drink bottlers and distributors.

The company thinks it is the first pharmaceutical house to use such advertising—a distinction that most ethical drug houses won't want to contest.

Why such a push on merchandising Sucaryl? Though Abbott is officially silent, trade sources speculate that the entry into the field of cyclamate manufacture by Du Pont—which holds patents (U.S. 2,275,125 and 2,383,617) on manufacturing processes—might have some sort of a cause-and-effect relationship.

Abbott's chemical business has grown to such proportions that production facilities are being expanded. This \$2.5-million project—amounting to half of the firm's capital expenditure program for '57—will add 30,000 gal. to reactor-vessel capacity, will increase floor space by one-third, to 120,000 sq. ft. at Abbott's North Chicago plant. The project is being financed by retained earnings. The firm hopes the first production batches will be turned out by early November.

What's the outlook for Abbott's bulk chemicals? The company looks for dollar volume to double in the next 10 years, both from increased production of current products and from new products. For example, arsanalic acid (which is second only to Sucaryl in dollar volume) has had a threefold increase in capacity.

The company expects to make its growth on its own, entertains no thoughts at this time about buying another outfit, or of seeking a merger.



WIDE WORLD

Hansen: There's really no change on antitrust position in . . .

The Du Pont Dilemma

Following up last June's Supreme Court ruling that Du Pont's stock interest in General Motors violates the Clayton Antitrust Act, government attorneys are pushing plans to completely sever the Du Pont-GM relationship. But developments last week indicate that disposition of the \$2.7 billion worth of GM shares that Du Pont now holds may take a little longer than expected.

Despite a flurry of reports that Du Pont would have to get rid of the stock, and get rid of it soon, antitrust chief Victor Hansen told CW last week that "there's nothing new or final" to report on the government position.

Open Opposition: Ever since the historic decision, Justice Dept. spokesmen have openly opposed any plan that would let Du Pont keep the stock permanently in a nonvoting arrangement. The department also opposes the idea of distributing the stock to Du Pont shareholders because such a plan would still leave large blocks of GM shares in the hands of Christiana Securities Co.—a Du Pont family holding company—and the Du Pont family.

It is known that federal attorneys feel the least painful approach would be for Du Pont to place the shares in a temporary trust until terms are agreed on. Then the company could sell or otherwise distribute them over a period of years. Antitrusters feel this would cause a minimum of upset to the stock market and the economy in general.

As things stand now, Federal Judge Walter LaBuy, after hearing alternative plans from both sides at a meeting scheduled to be held in Chicago on Sept. 25 will make his decision on terms of Du Pont's antitrust relief. And even after Judge LaBuy issues his decree, it's likely that the Supreme Court will be called on to rule on the final action.

Challenges Senate

A scientist-in-government is challenging the controversial conflict-of-interest philosophy of Senate Democrats. And although the issue won't be settled until early next year, it looks as though he may win.

Paul D. Foote, retired vice-president of Gulf Oil Corp., has taken over as assistant Secy. of Defense for Research and Engineering, after flatly refusing to dispose of his stock in Gulf and Standard of California. He told the Senate Armed Services Committee, before it adjourned in August, that the stock holdings represent a substantial part of his life savings.

Foote's nomination comes up again for consideration, since he took office under a recess appointment. But committee sources concede that he will probably be confirmed without a showdown on the stock issue.



WIDE WORLD

Oilman Foote: Despite conflict of interest, it's his life savings.

FOREIGN

Alkyd Resins/West Germany: Archer-Daniels-Midland, with its Dutch and German subsidiaries, has invested in a plant in Ruehle, near Meppen in Lower Saxony, to produce plasticizers, alkyd resins and paint vehicles. German investors participate in the operating company.

Sulfur, Fertilizer/India: Two fertilizer projects—one at Trombay, near Bombay City, the other at Nangal in East Punjab—will expand capacities via expenditures estimated at \$20-30 million. At Trombay, plant capacity will be trebled to 100,000 tons/year of fixed nitrogen.

In another move, the New Delhi government said it is planning to set up a National Pyrites Mining Corp. to prospect for—and eventually mine—sulfur-bearing pyrites. Current estimates indicate a sulfur manufacturing facility would require an initial investment of at least \$1.5 million. The proposed plant would have a 100-tons/day capacity. When the new firm makes its report, the government is expected to seek technical aid from foreign consultants.

Styrene/Italy: The Italian firm ANIC has awarded a contract to the engineering division of Societe Belge De L' Azote Et Des Produits Chimiques Du Marly for planning and building a 14,000-tons-a-year styrene monomer plant at Ravenna, Italy. Process information and engineering know-how will be supplied by Koppers Co.

Polyvinyl Chloride/Argentina: Imperial Chemical Industries, through its South American subsidiary, Duperial S.A.I.C., will build a 4,000-tons/year polyvinyl chloride plant at Capitan Bermudez, Rosario, Argentina. The company that will build the plant is Electroclor S.A.I.C., of which the ICI subsidiary and Cellulosa Argentina S.A.I.C. are the main stockholders. Cost of the plant: \$4 million.

Vinyl Acetate/Austria: Farbwerke Hoechst is building a vinyl acetate polymerization plant in Vienna, Austria. The plant will import raw materials from West Germany. The company hopes part of the plant can go onstream by the end of '57.

Glass, Minerals/Jamaica: Jamaica Glass Products, Ltd., a newly formed company, will build a \$2.5-million glass manufacturing plant in Jamaica, B. W. I. Extensive silica and quartz mining facilities will also be constructed. The mining operation and the plant are scheduled to start production in about 18 months.

Cellophane/Netherlands: Capacity of a newly opened 1,500-tons/year cellophane plant, built by Hollandsche Kunstzijde Industrie A.K.U. at Breda, Neth-

erlands, is scheduled to be increased soon. Investment in the plant thus far runs about \$2.5 million, but new cost and capacity figures have not been revealed.

COMPANIES

Johns-Manville Corp. plans to acquire Bestwall Gypsum Co. (Ardmore, Pa.), through an exchange of stock. Terms, approved "in principle" by directors of both firms, call for an exchange of 1½ shares of J-M common for each of Bestwall's 715,145 outstanding shares. At present market values, the transaction would involve \$40 million worth of J-M stock.

Ideal Cement Co. (Denver) has acquired Northwestern Portland Cement Co. (Seattle) through an exchange of stock (CW Business Newsletter, Sept. 7). Ideal exchanged 38,756 shares of its common stock, valued at about \$2.5 million, for all of Northwestern's assets. The deal is effective Sept. 30.

National Cylinder Gas Co. is making a public offering of \$17.5 million in subordinated convertible debentures to help finance expansion and retire \$6 million in bank loans. Merrill Lynch, Pierce, Fenner & Beane will market the issue. The securities will mature Sept. 1, 1977.

Coke: U.S. Steel will close down its beehive coke plant at the Leisenring No. 2 mine in southwestern Pennsylvania for "an indefinite period." The company said the shutdown, effective Oct. 1, is necessary because of increased coke production at its Clairton, Pa., plant. About 75 Leisenring employees will be affected

EXPANSION

Nuclear Power: The Atomic Energy Commission's Argonne National Laboratory, near Idaho Falls, Ida., will build a full-scale boiling-water reactor capable of developing 200,000 kw. of heat. Contractor is United Engineers & Constructors Inc. (Philadelphia).

Adhesives, Coatings: Borden Chemical Co. (Canada), Ltd., will build a \$400,000 adhesives and coatings plant in Toronto, Ont. The new unit will house both manufacturing and research facilities.

Pulp: Bowater Corp. of North America let contracts for a \$38-million pulp plant at Catawha, S.C. Initially, the plant will manufacture semibleached wood pulp from native pine for shipment to other Bowater mills. Builder: Bowater Carolina Corp., a new subsidiary.

Sodium Chlorate: Huron Chemical Ltd., Canadian chemical firm, will build a \$3.5-million, 20,000-tons/year sodium chlorate plant. Site: either Fort William or the Blind River area, Ontario.

CHEMICAL

September 21

A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

Protein Nutrient Balance Stressed in Newly Revised Study of Amino Acids

The role of amino acids in maintaining protein quality in poultry and livestock is given special emphasis in the fourth edition of "Proteins and Amino Acids in Animal Nutrition". by Dr. H. J. Almquist, recently published by U.S. Industrial Chemicals Co.

Considerably revised and expanded, the 32-page reference work includes information on the latest research in the field of amino acids. Tables on the amino acid composition of common poultry feedstuffs have been enlarged, and several pages have been devoted to the effects on protein quality of

heat treating soybean meal.

Copies of this useful reference work can be obtained from U.S.I. sales offices or by writing to the Editor, U.S.I. Chemical News.

Field Ion Microscope Uses "Matter Waves" To Visualize Atoms

A new instrument called a field ion microscope substitutes the incredibly short waves associated with atomic nuclei for those of visible light to resolve the images of atoms in metals.

In principle the microscope is a very simple device, resembling a TV tube. It has a fluorescent screen and a fine tungsten needle corresponding to the electron gun that paints the picture on the TV screen.

A high voltage strips helium atoms of their electrons, and their nuclei then drift to the point of the needle. A powerful electric field applied between the tip of the needle and a second electrode in the tube hurls "matter waves" associated with the nuclei against the screen. Here the atomic pictures appear at a magnification of 10 million diameters.

The technique is presently limited to the study of hard, simple metals, but these may serve as models for the study of others.

Molded Polyethylene Drums Pass Army Chemical Corps Rough-Handling Tests

Polyethylene Containers in Steel Overpacks Promise Easier, Safer Handling and Storing of Corrosive and Sensitive Materials

A series of rough-handling evaluation tests of four types of overpacks carried out by the Army Chemical Corps indicates that containers of molded polyethylene in steel overpacks can reduce the costly breakage often experienced in shipping corrosive and sensitive materials.

Defense Needs Help Define Role of Chemical Industry

The chemical industry's awareness of defense needs is important to its own prosperity and the nation's survival, it was pointed out at a recent meeting of the Chemical Buyers Group of the National Association of Purchasing Agents.

This awareness is important to the industry, because new military uses for chemicals often point to profitable commercial applications.

It is important to national survival in case of attack, since much of the defense program depends upon continued produc-tion of chemicals for military equipment and civilian supplies. Awareness of recovery plans for industry will aid in a faster return to production and orderly flow of materials to defense programs, a government spokesman said.

The chemical industry is being encouraged to plan for continuity of management. to store plant designs, production techniques, research data, and other essential records, and to provide for plant disaster

Breakage sometimes exceeds 10% when material of this kind is shipped in boxed carboys and carboy bottles. This can be reduced considerably by polyethylene packaging according to a recent article in "Armed Forces Chemical Journal" by Kenneth D. Brunelli. Chemical Warfare Laboratories, Army Chemical Center, Md.

Used 18 Drums In Various Sizes

To make its evaluation the Army Chemical Corps used eighteen molded polyethylene drums in 55-, 30-, 15-, and 5-gallon sizes, encased in overpacks. These overpacks were open-flange steel drum, solid-head steel drum, open-flange plywood drum, and wirebound crate. Also included were two molded poly-

ethylene drums without overpacks.

Tests were conducted according to the standard procedures of the Chemical Corps for material for this use, and consisted of (1) a two hour vibration test, performed on all plywood overpacks and half of the steel and wirebound overpacks; (2) a six foot free fall onto concrete; (3) an incline-impact test, performed on the overpack units only; and (4) a leakage test. All containers were filled with water to 98% of capacity.

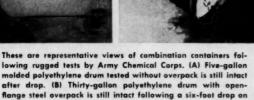
Polyethylene Units Showed High Degree of Burst Strength

Polyethylene units without overpacks showed a high burst strength. They withstood the drop test, including a drop onto a 4 x 4 timber from a MORE height of over six feet.

Polyethylene Drum in Steel Overpack Reduces Breakage











a $4^{\prime\prime}$ x $4^{\prime\prime}$ timber. The leak that developed at plastic plug closure was readily stopped by tightening closure. (C) The drum of 55-gallon capacity with plywood overpack splintered following diagonal drop. (D) Drum in wirebound crate is still serviceable after three drop tests.

September 21 ★

U.S.I. CHEMICAL NEWS

1957

CONTINUED

Polyethylene Drums

The polyethylene drums in combination with the steel overpacks gave the best protection to their contents, the report said. These overpacks were, however, deformed during the tests.

All of the plastic drums in the steel overpacks came through undamaged except for one 5-gallon size, which was punctured by the steel handle of its overpack

The plywood and wirebound crate overpacks splintered under the rough usage, and the nails and staples of the plywood overpacks punctured the plastic.

Although leaks developed at the plastic plug closures following the drop tests, the leaks were stopped in every case by simply tightening the closure.

Structural Failure Noted Only in One

Of the twenty polyethylene drums tested, structural failure was noted in only onea split along the top rim of a 30-gallon drum with plywood overpack.

As a result of these tests, it is reported that the Chemical Corps has recommended consideration of polyethylene drums in steel overpacks to replace glass or ceramic liners in rigid shipping containers for corrosive and sensitive materials that are compatible with polyethylene.

New U.S.I. Data Sheets On Organo-Aluminum Compounds Available

Data on four new organo-aluminum compounds, now available from U.S.I. in pilot plant quantities, are contained in recently published technical data sheets. The properties of ethylaluminum and methylaluminum sesquichlorides, trimethyl and triethyl aluminum are described in four separate sheets.

The sesquichlorides are not true chemical compounds but mixtures of alkyl aluminum dichlorides and dialkyl aluminum chlorides.

Trimethyl and triethyl aluminum are being tested as ignitors and fuels for jet engines. The entire group also shows possibilities as polymerization catalysts and as intermediates for chemical synthesis.

Titanium and Zirconium Studied for Surgical Uses



Titanium and zirconium have received and more attention as materials for special surgical appliances, according to recent literature.

Treatment of simple fractures is reputedly successful using titanium in a multiple plate technique without plaster immobiliza-tion. Tests on laboratory animals indicate that biological tolerance is high.

In one reported test, titanium discs were inserted into muscle, and the reaction com-pared with controls of tantalum, sterling silver and phosphobronze. After seven months the titanium was found to be inert and enclosed with a fibrous tissue capsule.

Lightweight, ductile zirconium has been tested for suturing, pegs, screws, and skull plates. Zirconium compares well with tan-talum, it was said, causing no measurable reaction in muscle fascia, bone, or brain, and proved superior to silver. Hemostatic brain clips of zirconium can be flattened more uniformly and hold better than those made of tantalum.

In general, comparisons between tantalum and silver and stainless steel on the one hand, and titanium and zirconium on the other, reveal net advantages for the latter two in terms either of corrosion resistance, weight, elasticity, ductility, or cost.

*References Surgery, 39: 470-3 (1956); Surg. Gynecol. and Obst., 87, 212 (1948); Jour. Neuro. Surgery, 5: 359-363 (1948); Jour. Neuro. Surgery, 5: 342-348 (1948); Surg. Gyn. & Obst., 71: 598 (1940); J. Bone and Joint Surgery, 33-A: 473 (1951).

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

An antiseptic coating material can be applied to objects which are handled by the public but seldom washed. It is applied by dipping, spraying or brushing, is useful for many personal articles as well.

No. 1271

Continuous sodium dispersion technology is described in a new USI brochure. Contains latest information on time-saving continuous preparation of dispersers.

No. 1272

A strippable coating is available as a protection for metals and other surfaces against alkali and acid solutions, platting solutions, etc. Can be sprayed, brushed or rolled on. Thick coating is reusable.

No. 1273

Three controlled-viscosity release agents for rubber and plastic molding and for die casting of certain alloys have been developed. They are said to be odorless, smokeless, non-corrosive,

An aerosol dispenser for gibberellin, a new plant growth stimulant, has been developed. A glass vial with a metered valve provides measured dosages, is said to be both convenient and

New developments in laboratory equipment now commercially available include corrosion testers, refrigerated centrifuges, stainless steel refrigerators, test cabinets, magnetic stirrers. No. 1276

The technology of liquid metals is discussed in a recent collection of papers now on sale in book form. The work deals with many aspects of the subject from the standpoint of the chemical engi-neer. No. 1277

For joining, filling, cladding, and surfacing masonry materials, three new plastic compounds are available. A brochure describes properties of the compounds and gives instructions for their

Simple castings for atomic shields can be made from a new polyethylene-lead compound. The ratio of polyethylene to lead is variable for effec-tive shielding against specific types of radia-

The making of glass-reinforced epoxy impressions is discussed in a new booklet. Applications of this widely used system are found in metalworking and model and pattern reproduction fields.

No. 1280

PRODUCTS O F USI

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ganic Chemicals: Ammonia, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide, Sulfuric Acid.

Esters, Ethers and Ketones: Normal Butyl Acetate, Diethyl Carbonate, Diethyl Oxalate, Ethyl Acetate, Ethyl Ether, Acetone.

Intermediates and Fine Chemicals: Acetoacetarylides, Ethyl Acetoacetate, Ethyl Benzoylocetate, Ethyl Chicoformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate solution, Urethan USP (Ethyl Carbanatus)

Animal Feed Products: Calcium Pantothenate, Choline Chloride Products, Curbay B-G® 80, Special Liquid Curbay®, Dt-Methianine, Niacin USP, Riboflavin Concentrates, Vitamin B₁₂ and Antibiotic Feed Supplements, Vacatone® 40, Vitamin A, D₃ and K₅ Products, Antioxidant (8HT) Products.

rmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Riboflavin USP, Urethan USP, Intermediates.

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Destruction by fire, frequently the fate of stricken aircraft, may be preventable.

Flameproof Fuels to Foil Aircraft Fires

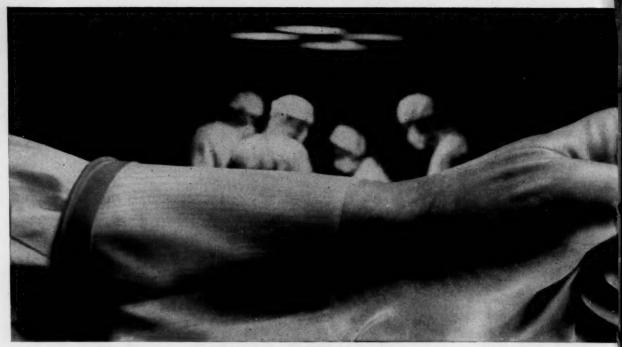
Last year, 336 lives and \$123 million in equipment were lost in the flaming pyres of aircraft that crashed in the U.S. and Canada. Nonflammable fuels could reduce this toll of lives, save countless millions now spent for design and operation of civilian and military aircraft to minimize fire hazard.

Nonflammable fuels are intended to burn only in the aircraft engine. They are envisioned either as conventional fuels to which a fire inhibitor has been added (the inhibitor being eliminated under engine operating conditions) or as two inert fluids that combine in the engine to produce power.

Most major oil companies as well as the government and nonprofit research groups are keenly interested in the subject. Southwest Research Institute (San Antonio. Tex.), for example, has looked into the part chemical additives play in creating or reducing static electricity.

A. L. Morse, chief of the aircraft division of the Civil Aeronautics Administration's technical development center (Indianapolis), recently told the National Fire Protection Assn. (in Los Angeles) that new aircraft are compounding the fuel hazard. In high-speed civilian turbojets, for instance, fuel tanks will be located in the fuselage, because wings will be too small for them. There's a need, too, for superior nonflammable lubricants and hydraulic fluids.

What price aircraft users will pay for the added safety of nonflammables is hard to say. But the market is sizable. U.S. aircraft consumed 75 million bbls. of gasoline, 3 million bbls, of lubricants last year.



3M Chemicals opening new worlds of use for film, rubber, tooling resin, epoxies

NEW FILM TAKES OVER A LIFE

A quick snip opens this radically new surgical suture package.

It's made of KEL-F® thin-wall tubing...a unique new halofluorocarbon material. KEL-F films and KEL-F tubing make film packaging of surgical sutures (and many other pharmaceuticals) possible for the first time.

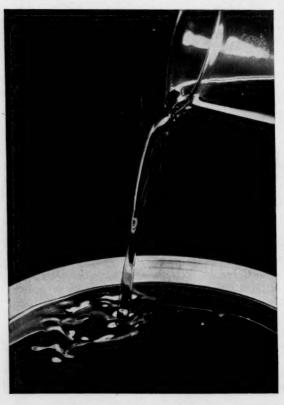
For KEL-F films and tubing share the remarkable features of the 3M chemical from which they are fabricated—KEL-F trifluorochloroethylene polymer, a product of the Jersey City Chemical Division.

KEL-F film and tubing are chemically inert, radiation resistant, heat-sealable, and impermeable, even to formaldehyde and medical alcohol. What's more, the tough new package they make is non-breakable, lighter, smaller and safer than the glass one it replaces. The result, KEL-F films or tubing perform this tricky, critical packaging job far better than *any* previous material.

And KEL-F trifluorochloroethylene polymer is but one of many new 3M chemicals increasing the performance of materials you make and use. Take film, rubber, tooling resin, epoxies, or dozens of other materials and processes. 3M chemicals are opening new areas of use for them all.

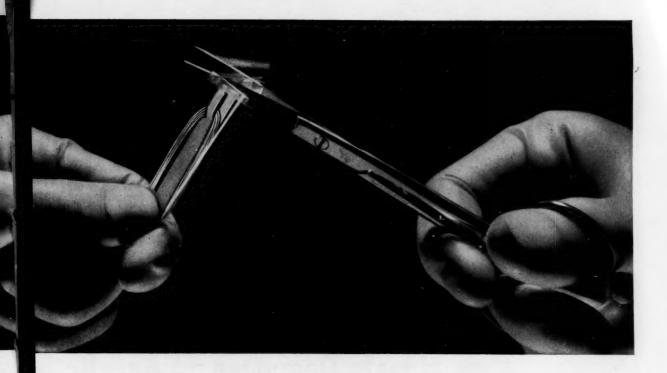
Investigate 3M chemicals. Consult 3M research. For free literature or information mail the convenient coupon at the right today!

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50

Chemical Week • September 21, 1957



AND DEATH PACKAGING JOB

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Size is no obstacle in casting with HC-111 by 3M. This new two-component tooling compound makes possible vacuum-forming molds, core boxes and driers of huge dimensions. Operators fill forms with catalyst-coated particles, then soak in resin. The resulting tools have high temperature resistance. And, because you waste no material, you save. HASTINGS CHEMICAL DIVISION

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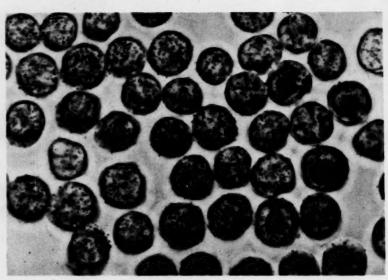
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Zefran cross-section shows globules of dye-receptive polymer.

How to Deep-Dye an Acrylic

O. R. McIntire, technical director of Dow's textile fibers department (Lee Hall, Va.), told the American Assn. for Textile Technology, Inc., last week that Zefran offers "more flexibility in the choice of dyestuffs than any other fiber, natural or synthetic."

He claims "unusual fastness" for vat, naphthol, sulfur, direct and neutral premetallized acid dyes on Zefran. And he says that Zefran is "more dyeable with cotton-type dyes than cotton itself."

For what is essentially an acrylic fiber, such achievements are no mean feat. In the past, acrylics (which are naturally hydrophobic and dye-resistant) have required chemical modification to improve dyeability. But these improvements sacrifice other fiber properties for optimum dyeability.

Modification may not solve the entire dyeing problem. Some modified acrylics are limited in their affinity for certain dyes; accept dyes only on the surface (exposing the undyed portion of the fiber under abrasion during wear); or simply lose strength and other desirable acrylic properties because of the changes made in the polymer.

Zefrati, however, features a new type of modification—in which a dyeable polymer is entrained in the acrylic fiber matrix (see photo). A strong hint of how this is accomplished is contained in Australian patent application 23495/56 (CW Technology Newsletter, Aug. 31).

The technique is said to be applicable to other hydrophobic fibers. Dow's patent application says as much, describes use of the technique to improve the dyeability of polyester fibers, too. (Not only fibers but also films, ribbons, etc., may be treated by the new Dow method.)

To improve dyeability, Dow impregnates acrylic fiber with a suitable monomer, polymerizes it *in situ*.

Before and After: There are several ways to do this, Dow says. According to the patent application, "The fiber may be in any desired state of formation for the treatment. It may be treated before or after any stretch is imparted to the fiber. In addition, the fiber may be in various stages of orientation, or in a gel, swollen or dried condition simultaneous with the treatment of the present invention. Wet-spun acrylic fibers are advantageously treated after a wet-stretching operation while the fiber is in an aqua-gel condition and prior to its being dried."

Dow lists these monomers as suitable for impregnating the fiber: vinyl-pyrrolidone; vinyl-benzene-4-sulfonic acid; diallyl glycerol; N-vinyl, N-methyl-acetamide; N-vinyl, N-ethyl-

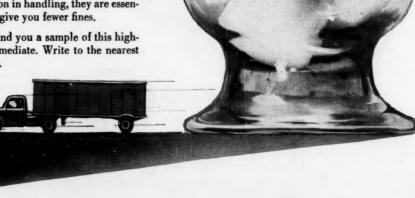
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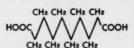
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To help you remember a few key things about sebacic acid (your research people will know the details) a typical molecular chain is represented below. The detailed parts of the chain are the sebacic radicals.

The sebacic acid chain is the longest straight chain found in any of the commercially available di-basic acids. The longer the chain, the more flexibility is available; the straightness or absence of branches makes the chain very difficult to disturb structurally.

No matter what you link with the sebacic chain — the basic chain remains the same. Link it with alcohols to make esters and you have plasticizers or lubricants. React sebacic with glycols to make polyesters; link the sebacic to diamine to make nylon; to alkyds for paint and coatings. The sebacic chain also appears as the backbone of high quality polyurethanes.



Whatever you do with sebacic acid, the sebacic link in the chain means exceptional resistance to weather or water, chemical or physical abuse, extremes of heat or cold.

The Harchem Laboratories have helped develop sebacic applications such as superior synthetic lubricants built around Di-octyl-sebacate and the new use in polyurethanes. Ever since

Harchem began commercial production of sebacic acid over a quarter of a century ago, the Harchem labs have worked with product manufacturers and government agencies to make the most of the permanence and durability, the flexibility and stability of the sebacic chain.

Harchem stands ready to assist you with your product development too. A request for bulletin H-32 and a sample of Harchem's 99% sebacic acid (C P grade) will quickly supply your development people with the pertinent information for initial investigation.

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RESEARCH

acetamide; N-vinyl-valerolactam; N-vinylcaprolactam-acrylamide and vinylpyridine, considers the first three best. Dow also lays claim to mixtures of any or all of these and like monomers that may be polymerized in situ to dye-receptive polymers.

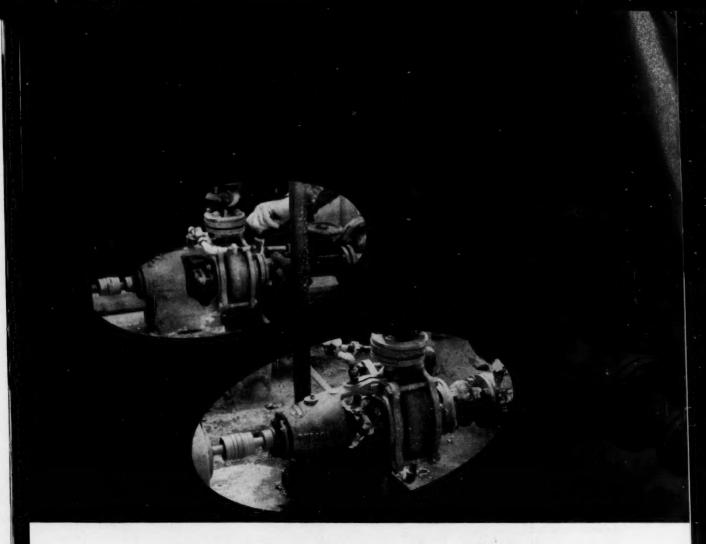
Example one in the patent application describes treatment of a wetstretched sample of a wet-spun polyacrylonitrile fiber by immersing it in an aqueous bath containing 94 parts of water, about 5.9 parts of vinyl pyrrolidone, about 0.035 parts of 30% aqueous hydrogen peroxide and about 0.11 parts of concentrated aqueous ammonia. The sample was kept in the bath at 75 C for four hours, removed. washed with water, dried, heat-set at 150 C and scoured. After dyeing with Xylene Milling Black, an acid dye, the fiber is reported to be uniformly and deeply colored.

In example 10, treatment of a "commercially available ethylene gly-col-terephthalic acid polyester fiber" with vinylpyrrolidone and azobisbuty-rodinitrile is described. The treated fiber reportedly displays marked improvement in its receptivity to acetate dyes (compared with its limited susceptibility in untreated form).

Dow still won't go on record concerning its choice of dye-receptive monomer in Zefran, but another Dow Australian patent application (22421/56) concerns a method of improving "the heat and light stability of polyvinylpyrrolidone and articles containing it . . . including fiber compositions . . ." Unfortunately, the PVP tends to become discolored when exposed to light and heat, minimizing the unstabilized polymer's value in fibers. Dow's answer: incorporation of zinc formaldehyde sulfoxylate in the PVP.

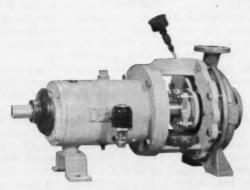
Dow's recommendation: in synthetic fiber compositions containing about 10% by weight of PVP, use anywhere from 2.5 to 50% but preferably between 10-25% by weight of sulfoxylate based on the weight of the PVP. The sulfoxylate Dow mentions is Du Pont's Sulfoxite S Conc.

Because of Zefran's composition, Dow has coined the term "nitrile alloy" to describe it. Considering the fiber's good physical properties (e.g., low shrinkage, 490 F "sticking temperature," good bulk, low density, etc.), the "alloy's" ingredients seem to be a happy choice.



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Series H Durcopump. A heavy duty process pum to handle high heads at most capacity ranges at Because Durcopumps have given excellent service under acid conditions in their Kraft Paper Mill, The Crossett Company specified additional Durcopumps for pumping alum solutions in the stock preparation area of their new Bleached Food Board Mill. The pumps illustrated are part of a continuous system preparing dilute rosin, starch, and alum for addition to the stocks. One pump operates twenty-four hours a day, seven days a week. The other pump is a standby, as down time would mean a plant shut-down. To date there has been no down time due to pump failure, and there has been no maintenance beyond routine servicing.

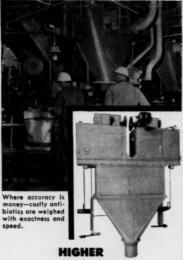
The Crossett Company's new mill produces 150 tons daily of bleached food container and packaging board. The new mill utilizes both pine pulp and pulp from some grades of hardwood timber previously in only limited use. It is the first mill of its kind.

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Royalty Income to Nonprofit Researchers*

... "The Rutgers Research and Endowment Foundation has thus far received approximately \$7 million in royalties under the streptomycin licenses and \$150,000 under those on neomycin, both domestic and foreign."

"From its Steenbock vitamin D patents, the Wisconsin Alumni Research Foundation obtained gross royalty income of \$14 million through 1946 and \$1,734,000 from Warfarin through 1955."

"During the past five years, the Institute of Paper Chemistry has received \$79,000 in licensing fees under 12 United States, one Canadian, and five Australian patents included in its portfolio."

*From "Patents and Nonprofit Research," a new report prepared by Archie M. Palmer for the Senate Subcommittee on Patents, Trademarks and Copyrights.

Nonprofit Research Return

A new report by patent expert Archie Palmer sheds light on a little-publicized subject. Palmer put together the comprehensive study called "Patents and Nonprofit Research" for Sen. Joseph O'Mahoney's patents subcommittee, intends it to guide and encourage smaller colleges in setting up their own research foundations. But within its pages are previously unpublished data, like the excerpts (above), that reveal how remunerative some patents have been to nonprofit research organizations.

Only a few patents have proved to be big earners, of course. And some have been spurned even when offered to manufacturers on a nonexclusive, royalty-free basis. Still, the earnings of successful patents make interesting reading.

The report reveals that Research Corp. has received about \$1.5 million/year in royalty income during the past five years. Licenses on vitamin B, alone have brought in over \$2.6 million. Cortical hormones, pantothenic acid, ergotrate, and vitamin A are other remunerative patents in Research Corp.'s portfolio.

Most independent nonprofit research organizations haven't been as lucky, the report reveals. Battelle Memorial Institute (through its wholly owned patent-holding subsidiary, Battelle Development Corp.) is the only independent that has realized any substantial return from its patents. Out of 200 Battelle patents, only 33 had produced income at the end of 1955. One of these, on Xerography, yielded more than \$750,000.

Where It Goes: Palmer explains that educational institutions with formalized research and patent policies usually have similar arrangements for distributing patent income. All of the net income of the Rutgers Research and Endowment Foundation goes to support scientific research and graduate instruction at the university's Institute of Microbiology.

When a patent is assigned to the Wisconsin Alumni Research Foundation, it pays the inventor (or his estate) a 15% royalty on net income (after the foundation has been repaid the expense of securing, maintaining and defending the patent). The remaining income is invested. Proceeds from the investments go to the University of Wisconsin to support scientific research.

Although the nonprofit organizations differ somewhat in the way they dispose of patent income, at least a share of the latter typically goes to support research.

CHEMICALS FROM TENNESSEE



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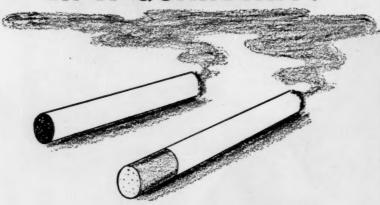


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RESEARCH

Progesterone Rival

One therapeutic drawback of progesterone is that it must be injected for maximum effectiveness. But this week, a new orally administerable steroid developed by The British Drug Houses, Ltd. (London and Godalmin, Surrey), is shaping up as a leading contender for progesterone's therapeutic laurels.

In addition, it's a potentially valuable oral contraceptive because, like progesterone, it interferes with ovulation.

The steroid is 6a:21-dimethylethisterone, one of several alkylated ethisterones synthesized and evaluated by British Drug's A. David, F. Hartley, D. R. Millson and V. Petrow, Hartley, the firm's chief research executive, coauthored a paper on the compounds at the recent British Pharmaceutical Conference in Bristol. He tells CW that further information would be "too helpful to outside interests." But it's no secret that the firm is highly encouraged with clinical studies now in progress, even though full appraisal of the new compound may be premature.

Hartley says the newcomer has about 12 times the activity of ethisterone (an orally active derivative of progesterone) when tested on rabbits. Unlike previous hormones having high progestational activity, the compound is relatively inexpensive to make. (For example, 19-norethisterone uses costly estradiol methyl ether as a raw material.) One observer, New York consultant Norman Applezweig, believes the British steroid may eventually cost in the neighborhood of \$1-2/g. to produce, require a daily dose of 5-25 mg. for contraceptive action.

That's appreciably less than the present cost of making competitive steroids. It's estimated that Norluton (19-norethisterone, made by Syntex and marketed by Parke, Davis) and G. D. Searle's Enovid (17-a-ethynyl-17-hydroxy-5(10)-estren - 3 - one) cost about 5-10 times as much to make. Details of a new Upjohn steroid under research haven't been disclosed. Upjohn has researched the same area as British Drug but isn't expected to launch a similar compound. (British Drug's steroid is reportedly covered in a June '56 Australian patent application.)

Low cost, of course, would be the



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METAL & THERMIT ORGANO **METALLICS**

R_nSnX_m—In this formula R may be alkyl or aryl; Sn repre-sents the metallic element Tin; and X an electro-negative group such as halogen, oxygen in substituted groups of the alkoxide, acid radical or hydroxide type, or electro-negative sulfur-containing groups. n+m must equal valence of Sm

For years Metal & Thermit has been the world's foremost producer of organic derivatives from the element Tin. Although each has its own distinctive properties, all have a strong metallic nature, and are generally characterized by remarkable stability. Today, Metal & Thermit organotin compounds are in demand by many industries for applications where chemical stability is needed and dependability of supply must be assured.



Silicon

Other Metals

Continuous research by M&T personnel experienced in the commercial development of organometallics is producing a variety of new organo compounds for commercial use. The most recent of these are based on Antimony, Phosphorus, Silicon, and a few other metals. M&T Organo-Metallics are serving or being investigated for use as catalysts, antioxidants, stabilizers, fuel and lubricity additives, anthelmintics, bactericides, fungicides, insecticides and herbicides. Inquiries on specific organo-metallic compounds for these or other uses will receive our prompt attention . . just write Market Development Division . . .

TIN & TIN CHEMICALS CERAMIC MATERIALS ORGANIC COATINGS WELDING SUPPLIES PLATING MATERIALS METALS AND ALLOYS HEAVY METAL SCRAP



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METAL & THERMIT-UNITED CHROMIUM OF CANADA LIMITED . REXDALE, ONT.

RESEARCH

key to widespread use of any new steroid as an oral contraceptive-particularly in low-income, highly populated countries. But it's a relatively slight factor in therapy. And it's more than likely that the new drugs will, for ethical and investigative reasons, be promoted as therapeutic agents for female disorders.

EXPANSION

- Bjorksten Research Laboratories for Industry Inc. (Madison, Wis.) has opened a new laboratory in Houston, Tex. Activities: chemical research in plastics, organic synthesis, coatings, adhesives, biochemistry, flotation, paper, leather, etc.
- Union Carbide's Linde division (Buffalo, N.Y.) has started construction of a new radiation laboratory at Tonawanda, N.Y. To be completed late this year, the lab will house a 4,000-curie cobalt-60 source, one of the world's largest.

PRODUCTS

Indole Entry: Indole intermediate 5-benzyloxyindole is now available from Regis Chemical Co. (Chicago) in research quantities. It's used in the synthesis of serotonin and serotonin analogs.

Price Cut: C14-uniformly labeled amino acids are now being offered by Schwarz Laboratories Inc. (Mount Vernon, N.Y.) at reduced prices. The firm has also introduced a new 50microcurie package for all its C14amino acids except glycine.

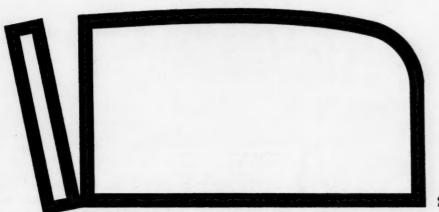
REPORTS

These reports are available from The Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D. C .:

- · "Stress Relaxation and Dynamic Properties of Ethylene Polymers" (PB 121924, \$1) compares the physical properties of linear polyethylene with those of a regular-grade polyethylene. With both polymers, these properties were found to be highly dependent on stress, time and temperature under normal usage.
- "High Temperature Evaluation of Antioxidants in Diester Base Fluids" (PB 121991, 50¢) concerns the problem of developing a sonic aircraft grease that is satisfactory in the -100 to 350 F temperature range. In an



PFIZERIDDLES ----



2.

- 1. How to make an odor-free plastic liner for bottle crowns? Pfizer Citroflex® A-4 is a completely odorless, nontoxic plasticizer, accepted by the Food & Drug Administration. It's ideal for the vinyl plastisols that crown manufacturers use as liners.
- 2. How to bring out the best in bread? By adding Pfizer L-lysine, an essential amino acid, bakers can raise the value of protein naturally present in specialty breads close to that of high quality animal protein.

If you have a problem which might be solved by a high quality organic chemical, think of Pfizer first. Contact Dept. WP, Chas. Pfizer & Co., Inc., Chemical Sales Division, 630 Flushing Ave., Brooklyn 6, N. Y.

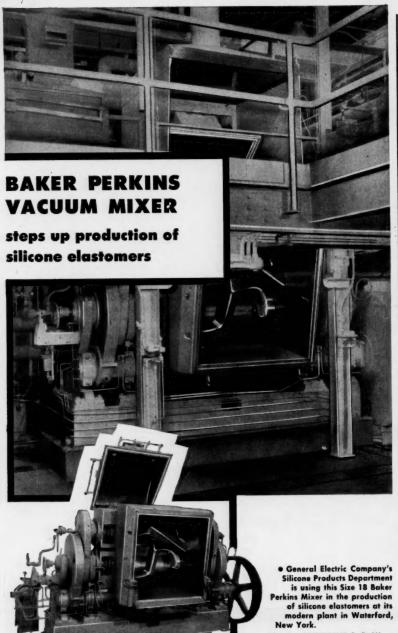
Some bulk products of this Division are:



Chemical Sales Division
...sells more than
100 organic chemicals
for food, medicinal and
industrial uses.

CITRIC, TARTARIC, OXALIC ACIDS AND SALTS - ASCORBIC ACID - CAFFEINE - VITAMINS - ANTIBIOTICS - PLASTICIZERS

7



The size 18JWUMM2 B. P. Mixer was designed specifically to meet this customer's exact mixing requirements. It is a big, heavy duty unit, that was built to the same high standards of materials and

workmanship that have made Baker Perkins the leader in the mixer field for over 64 years.

The same, dependable Baker Perkins vacuum mixers which have given unfailing service in such processes as compounding paints, rocket fuel and plastics, are finding immediate and enthusiastic acceptance in still other fields . . . silicones being only one of these.

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BAKER PERKINS INC.

CHEMICAL MACHINERY DIVISION . SAGINAW, MICHIGAN

RESEARCH

attempt to improve the high-temperature stability characteristics of synthetic diester base fluids, 14 oxidation inhibitors were evaluated. Included: samples of various organoselenium, organosulfur and organonitrogen compounds of the azole or oxazole type. Samples were submitted to oven storage at 350 F for eight days. Of the three groups of heterocyclic additives tested, the selenium-containing compounds, and in particular dimorpholine diselenide, appear most satisfactory for use at 350 F.

• "High Temperature Antioxidants for Synthetic Base Oils. Part VII-Evaluation of Antioxidant in Synthetic Fluids" (PB 121990, \$2.25) describes the evaluation of additives as antioxidants for nonpetroleum-base lubricating and hydraulic fluids in the range 400 to 700 F. Emphasis was placed on selected amines in methyl phenyl silicones, chlorophenyl silicones, and a tetrakis-n-dodecyl silane in the presence of aluminum, silver, copper, stainless steel and titanium. Acridines, dipyridyl amines and aryl phenylenediamines showed considerable promise in keeping the viscosity of the lubricants from increasing under oxidation. Five chlorophenyl phosphate fluids showed good stability to oxidation at 600-700 F in the absence of additives and metals. However, no additive was found that inhibited oxidation in the presence of metals.

• Excellent resistance to the high temperature of a blast flame is claimed for two of several heat-resistant paints in U.S. Army tests reported in "Heat-Resistant Paints for Rocket Launchers" (PB 121736, 50¢). Best: a zinc dust pigmented dibutyl titanate resin-type paint. An aluminum pigmented silicone resin-type proved almost as good.

• "Study of the Utilization of a Solar Furnace for High-Temperature Research on Solids" (PB 121930, 50¢) summarizes the major results and conclusions of five previous reports, says the furnaces are suitable for solids research, includes information useful in evaluating existing and proposed furnaces.

• A method of producing flame temperatures up to 4000 K using only commercially available chemicals is described in "Study of Ultra High Temperatures" (PB 121928, \$1). Hydrogen cyanide and a fluorine-oxygen mixture did the trick.



How Rare Metals licks a "tough" uranium pulp with Permutit SKB resin

 Rare Metals' ore produces a hardto-handle clay slime pulp difficult to contact with resin. This pulp is also high in molybdenum and other ions that make it necessary to "restore" the resin periodically with a caustic-nitrate solution that is hard on most resins.

In spite of these difficulties, Permutit SKB is showing fast loading and high capacity . . . as high as $3\frac{1}{2}$ or 4 lbs. U_3O_8 per cu. ft.! Resin losses are low. And production exceeds the design capacity of the plant!

A number of R.I.P. Mills use Permutit SKB for these same reasons. It was specially developed for R.I.P. extraction. It has high uranium capacity and fast elution, for higher production and lower precipitation costs; and it has excellent durability to resist chemical or physical breakdown.

Permutit SK (finer mesh than SKB) offers the same advantages in ion-exchange columns.

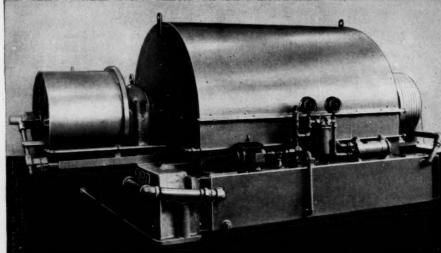
We'll supply full details and samples

to help you evaluate Permutit SK, SKB or other ion-exchange resins. Write: The Permutit Company, Dept. CW-9, 50 West 44th Street, New York 36, N. Y. or The Permutit Company of Canada, Ltd., Toronto 1, Ontario.

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Compare this rugged Bird Continuous Solid Bowl Centrifugal Filter with any other type of filter for ease and economy of installation, operation and maintenance.

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- filter solids that range from a half inch to a fraction of a micron
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a single penny. The Bird Research and Development Center is equipped to provide authentic, confidential pilot-scale test findings. It's yours to use.



BIRD

MACHINE COMPANY

Washington

Newsletter

CHEMICAL WEEK
September 21, 1957

The specter of a tough import-quota law is overshadowing the current hearings on voluntary curbs on oil imports. While such curbs have great significance to certain segments of the chemical process industries, the precedent that a tough, mandatory import-quota law would set as far as imported commodities in general are concerned may be of greater importance to industry. The real question, then, is this: Do voluntary plans to restrict oil imports have any chance of working out?

Experts in Washington, now that the first week of hearings on the Eisenhower Administration's 1,031,000-bbls./day-import-limit plan is over, are betting that the White House will be forced to grant some relief to newer importers, who are allowed smaller quotas than those importing oil in 1954, the year to which the proposed formula is tied. Come-lately importers may not be satisfied with adjustments they do get.

The temptation will be strong to disregard voluntary quotas. And if this happens, the independent domestic oil producers are certain to renew their drive for new import quota or tariff legislation on Capitol Hill next session.

Standard Oil of Indiana took the lead in proposing new formulas for recent importers at last week's hearings. Vice-President John E. Swearingen asked that all importers be allowed import quotas of 9.6% of their domestic demand instead of the proposed quotas (Indiana Standard's is 4.5%, while established importers can bring in up to 15%). Swearingen picked his 9.6% figure on purpose. The goal of the whole plan is to hold down total imports to 9.6% of over-all domestic demand.

New tariff relief is being asked by other domestic metals and minerals producers, now that the lead-zinc producers' appeal stands a good chance of going through. The Tariff Commission will likely o.k. a 50% duty increase plus a possible quota limit.

Tungsten people got their senators to ask the Tariff Commission to study their market problems, but their case for relief is expected to fall short. Copper producers want help, too, but will have to go to Congress, rather than the commission, because present copper import duties have been suspended by law.

Government titanium purchases are slowing down, to the exasperation of domestic producers. Sponge production has dropped by at least 25% in the last few months, the trade reports. Military aircraft budgets—which pay for 90% of titanium mill products turned out—are being held down. And the General Services Administration isn't signing any new incentive purchase contracts for sponge, because the government's annual production capacity goal of 22,500 tons has already been topped by some 9,000 tons.

Washington

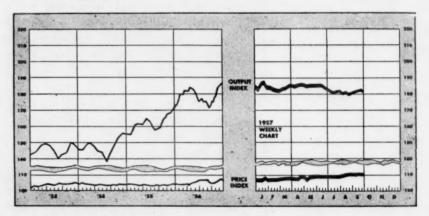
Newsletter

(Continued)

Is a big business firm a better government contractor than a small one? The National Security Industrial Assn., a group of some 500 important government contractors, including a substantial number of chemical companies, is coming out with a report that says that in many cases the big supplier is better equipped and more necessary to national defense, yet takes a bigger risk than a small company.

Best bet for small business, according to NSIA, is to tie up with an established big contractor. This view will draw quick fire from small business spokesmen in Congress and the Pentagon, who are already getting bitter complaints from small firms, which say they're being squeezed out of government contracts. Big companies, they say, are tending to handle more and more of their own production rather than farm it out to small subcontractors.

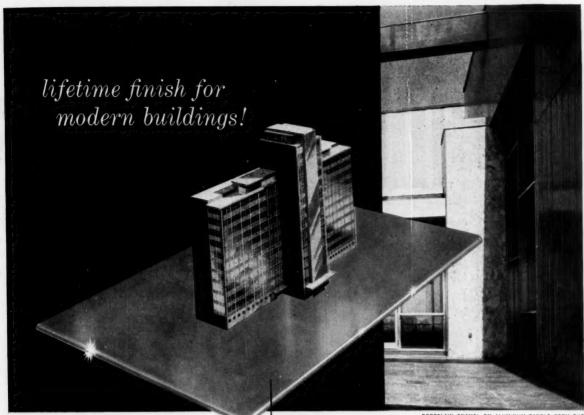
Hearings on atomic reactor permits, now required by law, are already being scheduled by the Atomic Energy Commission. Only a few construction permits are expected to be applied for each year—and none now on the horizon is likely to generate anything like the big fuss surrounding the reactor proposed at Monroe, Mich. This is the one being opposed on the safety question by Walter Reuther's United Auto Workers. The union's protest triggered the Congressional drive for the law that now requires hearings by AEC before either construction permits or operator's licenses are issued.



Business Indicators

WEEKLY	Latest	Preceding	Year
	Week	Week	Ago
Chemical Week output index (1947-49=100)	182.5	182.5	173.5
	110.9	110.9	105.8
Stock price index of 11 chemical companies (Standard & Poor's Corp.)	41.92	42.80	47.24

MONTHLY	Manufacturers' Sales		s'	Manufacturers' Inventories		
Trade (million dollars)	Latest	Preceding Month	Year Ago		Preceding Month	Year Ago
All manufacturing	28,917	28,142	26,825	54,105	53,853	50,037
Chemicals and allied products Petroleum and coal products	2,001 2,953	1,894 2,780	1,887 2,646	3,739 3,527	3,692 3,486	3,468 3,095



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The lifetime finish of porcelain enamel makes it a versatile modern architectural material. Used as a tough, ceramic coating for architectural aluminum, porcelain enamel enables architects and engineers to take full advantage of the lightweight metal for dramatic structural and decorative purposes. It enhances color appeal, durability and ease of fabrication.

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SALES AND DISTRIBUTION



Informal gatherings were sparked by serious discussion when salesmen's wives mulled over husband-helping ideas.

'How Can You Your Husband's

In the upper stories of Rutgers University's new library recently, 40 wives of sales executives came up with fresh answers to an old distaff question: What can I do to help my husband in his job?

The occasion was a feminine fillip to the wind-up of the fifth annual National Sales Executive's 2½-week summer school. Answers, produced in a lively brainstorming session, had little to do with ways of being a good "corporation wife." Rather, they centered on how to make a man's life easier and more pleasant at home. Ideas ranged from "help him with his paperwork," "keep the children out



Leader Crissy describes rules for first brainstorm panel.

Du Pont wife, Gynnie Franta, asks how test markets work.



PHOTOS BY LIONEL CRAWFORD



Recording ideas, faculty wife Lolly Mills takes cues from Crissy. The harvest: 84 aids.

Academic atmosphere was no deterrent. Wives outperformed husbands on volume of ideas.

Help Career?

S

from under," "be attractive" to "get to know his secretary," "keep informed on business conditions," "help him entertain associates."

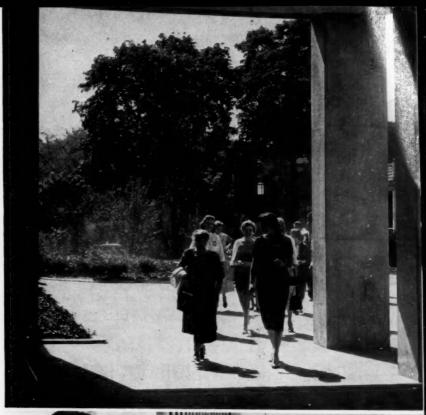
In a question-answer session before the brainstorming, personnel consultant and school faculty council director William Crissy told about courses the husbands were taking, answered questions about selling, and a woman's chances in a man's world.

What was most evident from the enthusiasm generated, however, is that the ladies are interested in anything that will help their sales-executive husbands get along in their careers.

This group asked how firms announce location changes to executives' wives.



Combining thoughts, wives asked if women can sell industrial goods in man's world.







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Before you make any plans for your new or expanded plant facilities, let Pritchard tell you more about the other advantages of their Single Responsibility Contract.

YOUR INQUIRY IS INVITED.

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NEEDS OF INDUSTRY AND CORPORATE UTILITIES.



SALES

Bid for Bulk

The first uninsulated high-pressure tank cars approved by the Interstate Commerce Commission for transporting liquefied petroleum gas and anhydrous ammonia have started rolling off ACF Industries, Inc. production lines. And from Tote System comes a new 300-gal. aluminum liquid tank and a carbon-steel bin for dry materials. Both are designed for conveyance on flat-bed trucks or railroad cars.

Big-Capacity Car: One advantage of the noninsulated cars is large capacity. They can carry the equivalent of 11,700 water gallons on 50 ton trucks, compared with the 11,050-gal. load limit of insulated cars.

New cars are designed lighter and shorter. Unladen, the new cars weigh 57,600 lbs., have an over-all length of 35 ft., 11½ in. Figures for the insulated type: 64,500 lbs., 37 ft., 5½ in.

Recent revision of ICC rules on high-pressure tank-car construction helped ACF get approval for its car. The new rules take cognizance of the availability of high-strength steel for tank-car construction. The ¾-in. Grade B steel in the new all-welded cars has a tensile strength of 70,000 psi., and withstands pressures of 400 psi. Because the thinner steel in the older-type cars has a lower tensile strength and a pressure rating of only 300 psi., it must be jacketed with heavy insulation to minimize internal temperature and pressure changes.

Another safety factor of the uninsulated cars is their white upperbody. The bright surface—prescribed by ICC—reflects heat, reducing liquid pressure about 10 F during hotweather months.

Big Drums: After two years of field trials, Tote System, Inc. (Beatrice, Neb.), is placing on the market a 300gal. aluminum tank with a standard top drum closure to permit easier access for filling, cleaning, and inspection. Contents can be discharged from the top by pumping, from the bottom by gravity. Tote is also launching a carbon-steel version of its regular aluminum bin. Capacities of the carbon-steel model range from 74 to 110 cu. ft. The bins cost one-third less than the aluminum version, are suitable where corrosion and contamination are not problems.



CLEAN HANDS-NO WATER?



As an emulsifier and jelling agent, saaps from Swift's Red Oil serve many grades of waterless hand cleaners. Good odor, color, and uniformity are essential and expected, here.

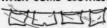
"FLOAT" SOME IRON?



An efficient collector for separation in iron ore flotation processes, Swift's Red Oil is low in titer, high in uniformity, high in selective ability.

KILL SOME PESTS?

Swift's Red Oils help make a low titer, uniform, high purity emulsifier for liquids; help suspend solids and lower surface tension, to cover greater areas more uniformly. WASH SOME CLOTHES?



Light color, excellent stability and bland odor help Swift's Red Oil help you to make excellent soaps for textile scouring or for use in textile chemicals.

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For use in emulsifiers for the lightest colored wax or the purest grade of cosmetic product, Swift's Red Oil is of dependable quality, good color and uniform from batch to batch.

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Collectively, Red Oils are a "workhorse" product but specifically, they must do your job. That's why Swift & Company uses SOLEXOL—a unique manufacturing process which works at a temperature far below that of vacuum distillation. It gives Swift's Red Oils the advantage of really effective, selective decolorization, and positive, controlled removal of impurities. With Solexol,

we are able to produce Red Oil #805 and #810—products which will meet many of the color and stability requirements laid down for premium priced, double distilled Red Oils.

Whatever you have in mind for Red Oil, you can be confident in specifying Swift's —in a grade tailored to your needs. Write for details on a trial order and remember . . .

ONE TRIAL IS BETTER
THAN A THOUSAND CLAIMS

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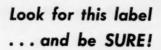
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The next time you order anhydrous caustic, make sure it's *Flo-chilled*. Call your Wyandotte representative or distributor.



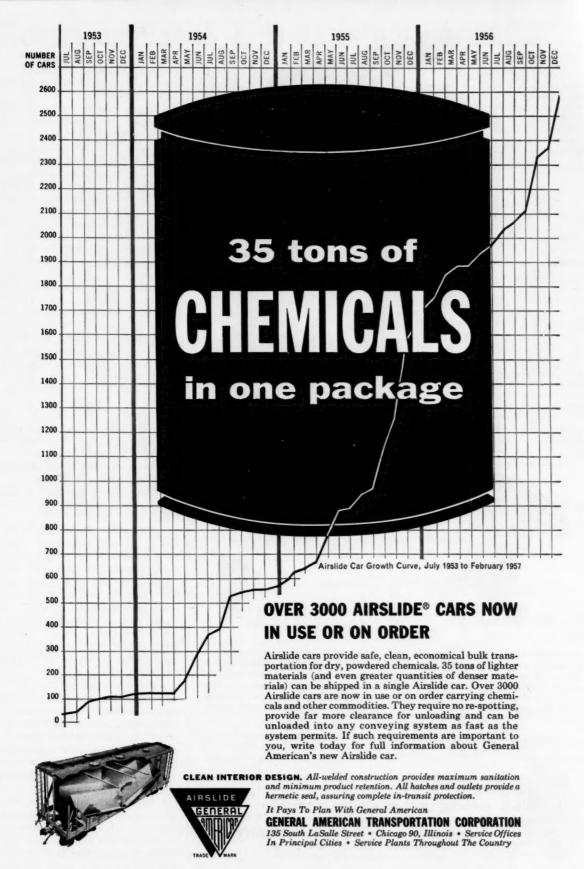




WYANDOTTE CHEMICALS CORPORATION, WYANDOTTE, MICHIGAN . Offices in Principal Cities

DATA DIGEST

- Hydrogen peroxide: Application in epoxidation and hydroxylation are stressed in new booklet. Reviewed are uses in the production of a wide range of materials—e.g., stabilizers, lubricants, synthetic waxes, solvents and drying oils. Solvay Process Division, Allied Chemical & Dye Corp. (New York).
- Fumaric acid: Data sheet summarizes main chemical reactions and uses, gives specifications and a wide range of production data for the acid. Pittsburgh Coke and Chemical Co. (Pittsburgh).
- 1, 2, 6-Hexanetriol: 8-page bulletin presents viscosity, compatibility, solubility and other physical data, explores applications in resin intermediates, humectant plasticizers, cosmetics and drugs. Union Carbide Chemicals Co. (New York).
- Catalog: New publication lists company's wide range of available chemicals. Among them: acetoacet and cyclic acid arylamides, carboxylic acids, chlorinated, hydroxy and nitro compounds, primary amines, pyrazolones, sulfonamides and sulfonic acids and salts. Pfister Chemical Works (Ridgefield, N. J.).
- Plasticizer: Booklet gives detailed physical properties for polymeric plasticizer, NP-10, suggests uses where viscosity and heat stability and weathering resistance are needed. Included: formulas for cloth coating, slush molding, foamed plastisols and clear films. Eastman Chemical Products, Inc. (Kingsport, Tenn.).
- 1, 1, 1-Trichlorethane: 16-page brochure discusses application as a cold-cleaning solvent in a wide range of industries. Dow Chemical Co. (Midland, Mich.).
- p-Cresol: Chemical reactions, specifications, properties and uses are delineated in new publication. Pigment, Color & Chemical Division, Sherwin-Williams Co. (New York).
- Rigid plastisol: Data sheet gives specifications of new plastisol, used-film properties and suggests uses in castings and coatings. Rubber Corp. of America (Hicksville, N.Y.).
- Liquid chemical packaging: Bulletin gives suggestions on use of plastic bags with corrugated overpacks for shipping fluid materials. Fibre Box Assn. (Washington, D.C.).
 - Detergent inhibitor: 14-page re-





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ACE Rubber-Lined Steel . . . strength and pressures of steel plus chemical resistance of hard rubber. Excellent for alkalis, most inorganic acids, many organic acids, all salts, bleaches. Sizes 11/4" to 24" and up. Bulletin CE-52.

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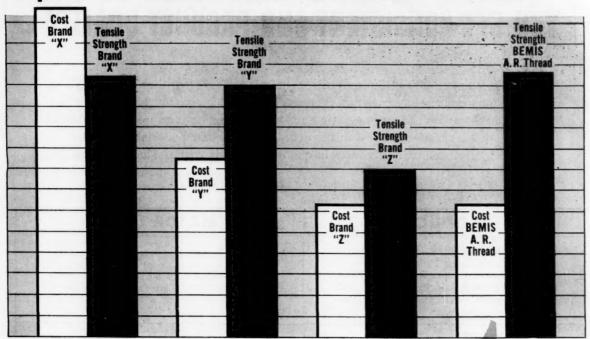
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SALES

port describes use of Paranox 302 in lubricants to prevent formation of corrosive materials. Enjay Co. (New York).

- Silicon rubber: Folder presents information about resistance to heat, cold, weathering, ozone, moisture, lubricants and chemicals. End-uses are suggested in jet engines, steam irons, mechanical transmissions, gaskets, etc. Dow Corning Corp. (Midland, Mich.).
- Mica: Folder indexes technical bulletins on mica properties and uses by bulletin number and subject. Wet Ground Mica Assn. (New York).
- Organic chemicals: Kit contains 28 separate data sheets for wide range of chemicals, including allyl acetone, benzaldehyde, benzoic acid, cinnamic acid, cyanoacetamide, ethyl phenyl diethyl malonate and other chemicals. Benzol Products Co. (Newark, N.J.).
- Explosive packaging: Booklet describes bags used for packaging explosives. Chase Bag Co. (Chicago).
- Petroleum gas: Manual, "Design and Construction of Liquefied Petroleum Gas Installations at Marine and Pipeline Terminals, Natural-Gasoline Plants, Refineries and Tank Farms," is available from American Petroleum Institute (New York).
- Drum cleaning: Folder describes use of automatic machine for cleaning drums, gives specifications and safety precautions. Pangborn Corp. (Hagerstown, Md.).
- Flammable liquids: New edition of "Flammable Liquid Tradename Index" lists flash points of 3,600 liquid products, identifies each with respect to use and producer. National Fire Protection Assn. (Boston).
- Car shaker: Illustrations and specifications of components describe characteristics and operation of push-button-controlled mechanism for shaking contents of hopper cars. Allis-Chalmers (Milwaukee).
- Pentaerythritol: Formulations and laboratory preparation of resins based on pentaerythritol are discussed in new booklet. Also includes data for drying oils, rosin esters, in situ varnishes, alkyd resins, flat wall alkyds and bezoic acid, phenolic and vinyl modified alkyds. Heyden Newport Chemical Corp. (New York).
- Hydrofluoric acid: Vapor pressure, boiling point, density, heat of dissociation, and handling data are furnished in new company brochure. Stauffer Chemical Co. (New York).

Report on BEMIS Acid-Resistant Thread:



LOWEST COST HIGHEST STRENGTH AFTER SEVERE TEST

When your multiwall bags are made and closed with BEMIS Acid-Resistant Thread you're giving your customers the best packaging — and it costs less

Here's proof of the exceptional value you get from Bemis Multiwalls, made and closed with Bemis Acid-Resistant Thread...

An interested, independent, outside organization* conducted rigorous tests with four well-known industrial threads—Bemis Acid-Resistant Thread, a widely used synthetic filament thread, and two other competing threads.

Two samples of each thread were buried in triple superphosphate (0-45-0). One set of samples was placed in a high-humidity room (100°, 90% R. H.) openly exposed. A second set was kept under more

normal conditions (73°, 50% R. H.).

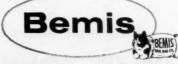
After twelve weeks in the superphosphate, the samples were removed and tested for tensile strength. Bemis Acid-Resistant Thread and the synthetic filament (long considered to set the top standard) came out with almost exactly the same score . . . and both were substantially ahead of the other two threads.

But here's the payoff—Bemis Acid-Resistant Thread costs less than half as much as the only other thread that equalled it in performance. (Incidentally, it performs in sewing machines just like the famous Bemis Special Thread.)

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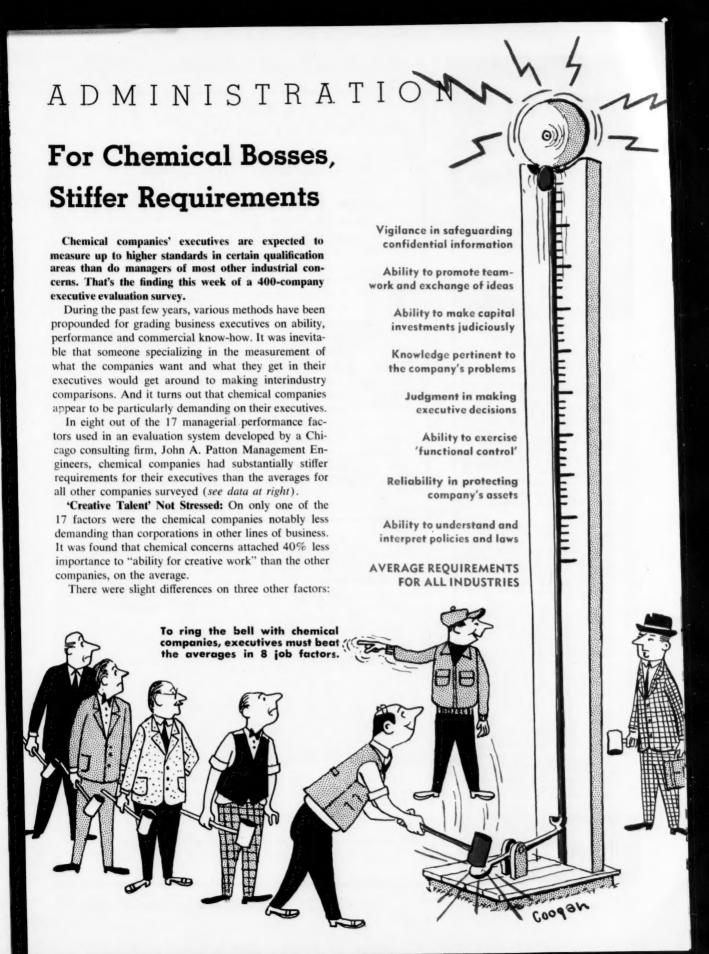
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How Point System Works

(Excerpts from scoring scale for one of the 17 factors used in Patton system for measuring executive position requirements)

Factor No. 1—Knowledge

Position requires knowledge and ability to use ordinary business mathematics; understand and issue verbal or written instructions; understand blueprints, paper-work procedures, or a mechanical trade; write or dictate ordinary correspondence. Perform or supervise activities within a section of a departmental function

Generally routine and repetitive activities:

26 points

Position requires highly specialized knowledge of basic principles and concepts in a science or profession and experience in application of this knowledge in solving new or highly complex problems in various fields; or advanced knowledge in more than one specialized field, and a good working knowledge of most major business functions

Total corporate administration; greatest degree of complexity and diversity, corporationwide:

240 points

"ability to exercise line control,"
"readiness to face personal hazards"
and "physical demand." In each case,
chemical company requirements were
a shade more modest than the all-industry average.

On the other five factors, there was no significant difference between requirements by chemical corporations and those of nonchemical companies: planning, accuracy, relationships outside the firm, corporation policy for-

Requirements vs. pay in 3 chemical companies

(Patton-system point totals and salaries being paid at time of survey).

Company sales volume	Controller	Sales and sales promotion manager	General manager
\$1- 3 million/	889 points/	886 points/	1,528 points/
year	\$6,000	\$12,000	\$12,000
\$3-10 million/	904 points/	848 points/	1,335 points/
year	\$10,000	\$11,000	\$17,000
\$25 million/year	968 points/	1,158 points/	1,308 points/
or more	\$12,000	\$17,000	\$22,000



Sodium Tripolyphosphate • Trisodium Phosphate • Tetrasodium Pyrophosphate • Tetrapotassium Pyrophosphate • Sodium Polyphos (Sodium Hexametophosphate-Sodium Tetraphosphate) • Sodium Acid Pyrophosphate • Trisodium Phosphate Chlorinated • Disodium Phosphate • Hydrofluoric Acid • Sulfuric Acid • Sodium Fluoride • Sodium Silicofluoride • Hygrade Fertilizer • C-29 Sequestering Agent • Teox 120 (Monionic Surfactant)

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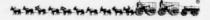
does this newest of our boron products hold a promise for you?

Newly available in limited quantities! Crystalline Boron, with a purity of 99+%, is now ready for you as a new material for research. The sheen of Boron gives it a metallic appearance... but resemblance to metals ends there! In hardness, Crystalline Boron ranks very high. As a conductor of electricity, Boron has unusual characteristics. These facts suggest possible utility in the abrasive and electrical fields. We believe there are many other fields of application for this product. Do you have a possible use for Crystalline Boron? We hope this new companion product to our Amorphous Boron will aid you in your research program.

Experimental samples of Crystalline Boron can be furnished in a variety of mesh sizes. Samples are usually furnished in small chunks, about the size of a pea. Write to us on your company letterhead, directing your inquiry to our Product Development Department.

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POINT PAY PARALLELISM

(One company's executive salary scale, as revised to accord with point scores for various positions)

Position	Point score	Monthly salary range
	_	
Personnel manager	1,755	\$730-990
Production		
manager	1,850	820-1,100
Controller	1,990	970-1,290
Sales manager	2,150	1,120-1,470
Chief engineer	2,235	1,200-1,580

mulation, and surroundings.

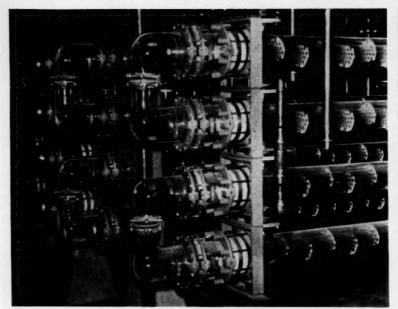
Executive Shortage Cited: The survey was based on an executive evaluation point system devised by Patton's vice-president for engineering, Frank Adams, who offers the plan as a step toward overcoming the current shortage of top-caliber executive personnel.

Adams—an industrial management engineer who, during the past 25 years, has worked for Westinghouse, General Motors, U. S. Steel and Fairchild Airplane—holds that lack of a sound executive personnel program is often the reason why otherwise progressive organizations are suddenly faced with a dearth of actual or potential good managers within the companies.

Such a personnel program, Adams contends, should be based on selection, development and evaluation of performance. He says that frequently an executive is operating at a low level of performance simply because there's no clear understanding between the executive and his superior as to what the position entails. "We have found," Adams told CW, "that once the ambiguous atmosphere in the executive stratum is eliminated, it is relatively easy to raise performance levels."

Self-imposed Standards: In practice, the Patton evaluation system involves use of elaborate scoring charts that serve as guides in assigning point values to job requirements (table, top of p. 78). This establishes what is ex-





Corrosive dye liquor passes through sixteen 50-sq.-ft. standard PYREX brand shell and tube heat exchangers heating fresh boiler water.

How glass puts lost B.t.u.'s back to work

7½ million units/hour reclaimed from hot, corrosive wastes

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So now incoming fresh water picks

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If you are throwing heat away, send the coupon for a bulletin on PYREX brand Modular Shell and Tube Exchangers. They pay their own way.

ADMINISTRATION

pected of a position holder; the second step is to determine how well the executive is living up to those expectations.

In that second step, Adams insists that the executive himself must provide the "yardstick" for performance measurement. "The manager, himself, will set his own sights, much as a runner sets his own pace," Adams declares. "But the superior must be an alert coach who records and tempers performance according to the dictates of experience and company policy."

A third step is setting up an equitable salary range. In the survey, it was found that salaries frequently were out of line with responsibilities, as measured by point totals (bottom table, p. 78). For each company sur-



BACHRACH

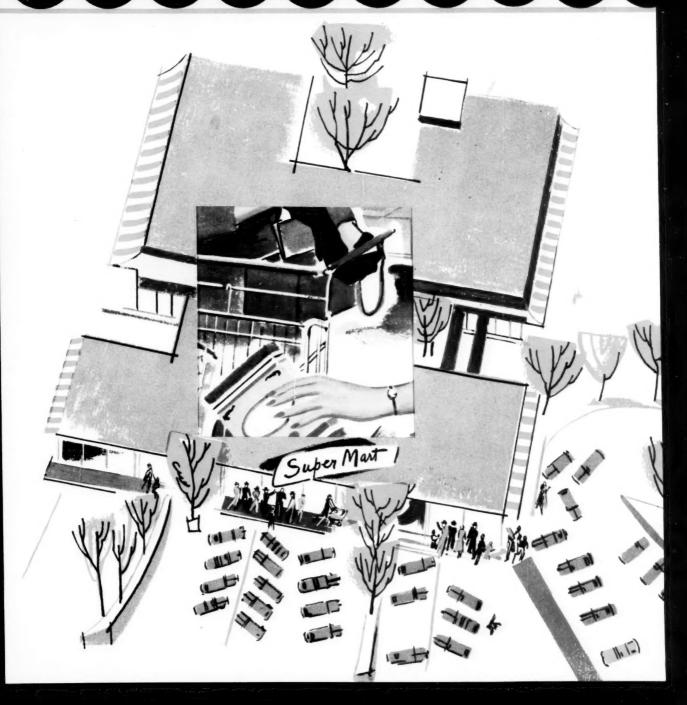
Adams: His system shows chemical companies are more demanding.

veyed, the Patton engineers suggested a new salary scale more closely paralleling the point scores (table, p. 80).

Trade Secrets Treasured: The fact that the chemical industry ranks near the top among U.S. industries in research budgets is reflected in the finding that "vigilance in guarding confidential information" stands at the top of the list among the factors in which chemical company requirements are higher than those of other concerns.

This factor measures the responsibility vested in a given executive position for safeguarding the company's plans, processes, formulas,

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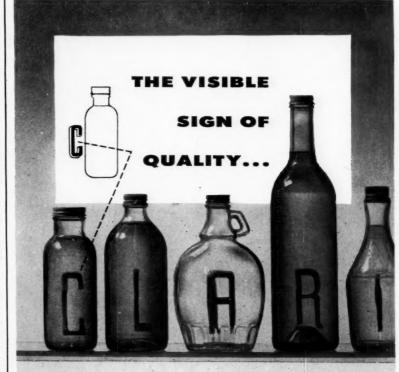
CW

ADMINISTRATION

products and other trade secrets, disclosure of which could result in financial loss to the company. Chemical company requirements: 96% higher than other companies' average.

Other Patton-system factors on which there's a substantial spread between standards of chemical and nonchemical companies:

- Relationships inside the corporation—Measure of ability required in a given position to make favorable impressions on others; to use tact and diplomacy; to exchange ideas and discuss problems objectively; to secure from others *inside* the corporation the proper degree of respect, attention, cooperation and concurrence that will promote the interests of the corporation. (This factor does not include relationships with "line" subordinates or superiors.) Chemical company requirements: 85% higher than other companies' average.
- Capital investments—Measure of responsibility vested in a given position for making judicious investment of capital in fixed assets. Chemical company requirements: 50% higher than other companies' average.
- Knowledge—Measure of the amount of knowledge required by the position holder to understand and solve the problems that arise in discharge of assigned duties and responsibilities. This knowledge represents accumulated mental development acquired both through academic training and practical experience. Chemical company requirements: 48% higher than other companies' average.
- Judgment—Measure of degree of judgment required in a given position. "Judgment" is defined as operation of the mind—involving comparison and discrimination—by which knowledge of values and relations is formulated. In this factor, the character of judgment required is considered first, and importance of decisions is considered second. Chemical company requirements: 41% higher than other companies' average.
- Functional control—Measure of the responsibility in a given position for exercising functional control, defined as determining adequacy of approved policies, methods, procedures or programs for either present or future use and/or appraising effectiveness of performance in areas not under line control of the position



Clarity of a liquor means many different things. In the food field, for example, it spells customer acceptance (which is why so many food processors use Dicalite Filteraids). To the chemical engineer, the brilliant clarity obtained with high-efficiency Dicalite Filteraids represents the essential first step along a quicker, easier course to desired quality in the end product.

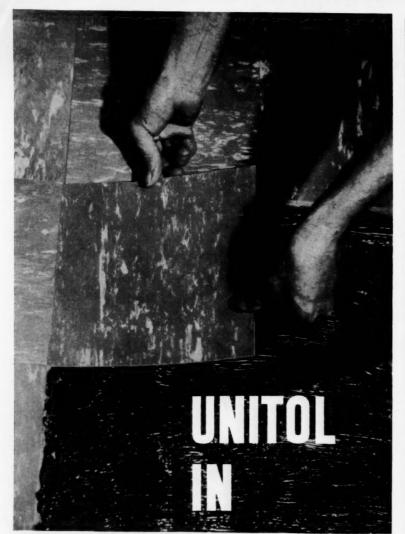
Even the most difficult liquors can be filtered to required clarity with Dicalite Filteraids... and filtered at economically fast flowrates. There are 8 Dicalite Filteraids, differing principally in particle size and range, to handle the removal of unwanted particulates, even those in the colloidal, bacterial and sub-micron range.

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ADMINISTRATION

holder. Chemical company requirements: 38% higher than other companies' average.

· Care of corporation assets-Measure of position holder's responsibility for protecting the corporation's assets, including safe storage of finished products, raw materials and supplies; maintenance of buildings, machinery and equipment to prevent loss or damage beyond normal wear or obsolescence; safe-keeping of funds, negotiable documents and papers, etc. First and second considerations are importance of assets and difficulty of protecting those assets, respectively. Chemical company requirements: 36% higher than other companies' average.

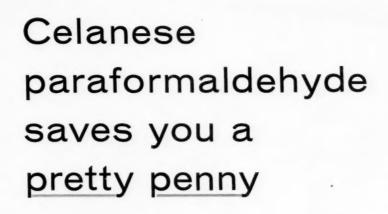
• Policy interpretation—Measure of responsibility for understanding corporation policies and for correct interpretation of them to associates and subordinates inside the corporation and to suppliers, customer agencies, and others outside the corporation. (Laws and directives from governmental agencies having jurisdiction become, perforce, corporation policy.) Chemical company requirements: 21% higher than other companies' average.

• Creative work—Measure of responsibility for performing creative work, such as conceiving, developing and perfecting products, processes, design, equipment methods, programs, etc. Chemical company requirements: 40% lower than other companies' average.

Air Pollution Course

This week, employees of 27 chemical process firms were weighing information gained at a two-day air pollution control training course held at Tacoma. Besides the industry men, 48 representatives from government, public health and air pollution agencies, and educational institutions from Washington state and Oregon attended the course. The course was sponsored by the Washington State Dept. of Health and Oregon State Air Pollution Authority in cooperation with the U.S. Public Health Service.

Discussion and Displays: Three specialists from the Public Health Service's Robert A. Taft Engineering Center (Cincinnati) provided instruction, and participants inspected displays of equipment used in combating air pollution.



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Officers* of 'Carbide Pioneers' help fellow employees plan . . .

'Unretired' Retirement

Chemical process management men who are finding that nowadays it takes more than a gold watch and a pat on the back to put a retiring employee at ease will do well to take a look at a unique old-timers' club recently formed at Union Carbide Chemicals Co.'s Texas City, Tex., plant.

The club: the Carbide Pioneers, composed of retired and active employees 55 years old or older who are anxious to retain dignity and independence, proving to themselves and others that senior citizens can make significant contributions in a complex industrial society.

This week, as the more active fall work schedules come into full swing, Carbide Pioneers are busy with plans for new in-plant and community activities. To Carbide management such planning is a welcome sight, for past activities of the club have resulted in community praise, and the group action itself has helped produce more satisfied, contented elderly employees.

Industrial Relations Brain Child: Brain child of Carbide industrial relations man Harold Kerst, the Pioneers club is more than a civic service group and social club. At monthly meetings, members are instructed in matters of vital interest to them. At a recent meeting, for example, the manager of the plant's insurance and benefits division talked about insurance after retirement and various phases of retirement and pension plans. Future programs will cover such topics as "How to Stay Alert After Retirement," "Social Security Benefits" and "Health After 65." Educational programs are balanced with entertainment that has included social affairs and discussions and films on fishing and hunting.

For Kerst, Carbide Pioneers has a personal significance. It was while discussing the subject of retirement with his father, an employee at the plant who has passed the retirement age, that Kerst became aware of the attitude of dread, fear and hopelessness that comes from facing forced retirement.

Kerst began studying the situation in the plant, and casual conversations with plant workers revealed the frustration shared by numerous employees past 55 and nearing retirement. The industrial relations man planted the seeds of action by suggesting to employees, "Why don't you talk it over with the boys and see if there's enough interest for some sort of club?"

Within a month, the first meeting of the Carbide Pioneers club was held, attended by 34 old-timers. The plant newspaper gave the new club publicity, and Kerst followed up with personal invitations to eligible workers and retired employees.

Thus, the plant embarked on a program for elderly employees, a program, oddly enough, that had not been needed before. The question of retirement had always been a problem for the "hazy future." The plant was only 17 years old, and no one had retired until three years ago, and then only for reasons of poor health.

Souvenirs for Students: First civic project undertaken by the club was preparation of souvenirs for the state convention of high school student councils. The Pioneers wanted to include something representative of Carbide in the souvenir packets, so they obtained samples of Vinylite and polyethylene plastics from which they made 3,200 cards identifying the products and the manufacturer.

Next came a fishing project for the kids. Aware that a plant reservoir was overpopulated with fish, club members suggested, "Why not let the kids fish them out, instead of draining the reservoir?" Management agreed, and the club carried out the entire project, including rules, schedules to take into consideration shift workers, and safety precautions. Movies made of the "fishout" were televised and the club gained community-wide recognition and approval.

Other civic projects have included a two-day tour of duty as couriers and messengers during the Galveston County Salk vaccination program, and designing and constructing a 25-ft.-long, 16-ft.-high replica of Jean La-Fitte's pirate ship for use as a gateway to the Galveston County Bay Area camp site at the International Boy Scout Jamboree at Valley Forge, Pa.

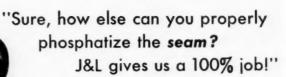
Carbide management is pleased with the club. The plant superintendent said, "These men aren't old-timers, they're 55-year-old youngsters." The club is credited by management with causing "an awakening of the good old spirit of personal enterprise and a buildup of human dignity."

^{*}President Tex Turrentine (left) and Secy. J. P. (Pop) Jones.

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ADMINISTRATION

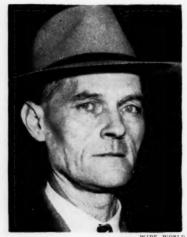
IDEAS

Attracting Agricultural Scientists: Agricultural chemicals industry management is making a determined bid to draw more students into the study of agricultural sciences. A major item in the campaign is a career book prepared by management and published in the August issue of National Agricultural Chemicals Assn.'s News and Pesticide Review. The book covers career opportunities offered by agricultural chemicals makers. It has been timed to coincide with the new school year, has been placed on the source material list of the President's Commission on Education. It's being merchandised to 4-H and Future Farmers of America leaders, agricultural radio and press and colleges throughout the country. According to NACA Executive Secretary L. S. Hitchner, 25 colleges already have requested additional copies of the publication.

LEGAL

Systoban Suit Settled: Chemical Formulators (Nitro, W. Va.) has been found guilty in U.S. district court (Charleston, W. Va.) of trademark infringement in using the name Systoban for an insecticide it markets. Federal Judge Ben Moore permanently enjoined the company from further use of the tradename.

Suit was brought in March by Chemagro Corp. (New York) (CW, April 20, p. 104), which has been marketing for a number of years an



Judge Moore: He agrees—Systoban sounds too much like Systox.



new ways to solve problems - with chemicals

THERMOSETTING RESINS MADE FROM CONIFEROUS BARK are said to be good substitutes for, or additives to, phenol aldehyde resins. The bark is treated with sodium hydroxide, then reacted with formaldehyde to form the resin. A paraformaldehyde solution in water or formalin, with varying amounts of alkali, is stirred in to form a smooth paste suitable for plywood adhesive. It is reported that pre-extraction of the bark with benzene produces a superior resin, as does the addition of 20% by weight of a phenol or 3,5-xylenol.

URBA AND THIOUREA SEPARATE CERTAIN ORGANIC COMPOUNDS.

Urea forms preferential adducts with organic compounds having straight chains of 6-50 carbon atoms; thiourea forms adducts with branched and cyclic compounds having 3-50 carbon atoms.

Low-boiling aliphatic alcohols are used as solvents. Adducts form at any temperature from 0-100 F.; 80 F. is preferable.

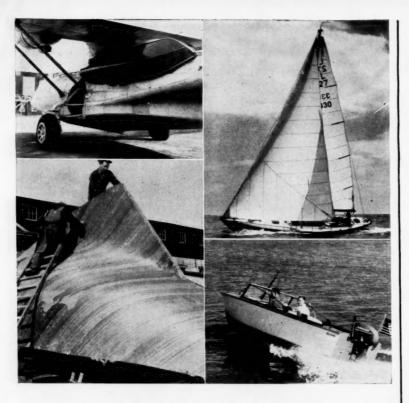
A PATENTED PROCESS FOR PURIFYING MOLASSES employs methanol and an acid to separate out undesirable cations. One part by weight of molasses is mixed with up to two parts by weight of methanol. An acid is added which forms salts with the cations present; these salts are insoluble in the molasses-methanol mixture. Enough acid is added to give a pH of 1-5 at 20 to 80 C. Liquid and solid phases are then separated and a pure sugar is crystallized from the liquid phase.

PRACTICALLY PURE ACETYLENE is obtained from crude acetylene streams by a recently developed system. A recoverable ammonia solution removes carbon dioxide; passage through a heat exchanger removes aromatic hydrocarbons and water. The acetylene and its homologs are then dissolved in liquid ammonia, and the solution is fractionated. Practically pure acetylene is produced in the head fraction.



Information appearing here is published as a service to readers. Although we do not make the end products mentioned, we can supply you with these basic chemicals:

ethanolamines • ethylene oxide • ethylene glycols • urea • formaldehyde
U.F. Concentrate-85 • anhydrous ammonia • ammonia liquer • ammonium sulfate
sodium nitrate • nitrogen solutions • nitrogen tetroxide
fertilizers and feed supplements.



WATER RESISTANCE

...in phenolic resins

Among many industrially valuable properties of phenolic resins developed by Durez, resistance to water absorption is well and truly demonstrated in boat hulls.

Craft ranging from sailing sloops to outboard runabouts and fishing skiffs transported on the side of amphibian planes are now made of molded plywood, Durez-bonded into a waterproof monolithic structure. Builders say such hulls are as tight as though the wood had grown into shape on the original tree, but many times stronger and more shock-resistant than a single thickness of wood could ever be.

Caulking and puttying are eliminated. The molded hulls do not support

fungus growth. If heavy grounding or pounding on rocks abrades or punctures the shell, it is more easily repaired than a planked vessel.

Durez enters the picture when the hull of thin strips, laid up over a form in as many as nine plies, is subjected to steam pressure which cures the resin. This bonds the plies permanently into a one-piece molded hull.

As pioneers in developing phenolic resins, may we suggest that these versatile materials could have a problem-solving part in your operations? They are mechanically strong, possess excelent electrical properties, and are resistant to many acids and alkalies as well as to heat and cold. Let us help you.



DUREZ PLASTICS DIVISION

HOOKER ELECTROCHEMICAL COMPANY

909 Walck Road, North Tonawanda, N. Y.

Export Agent: Omni Products Corp., 460 Fourth Avenue, New York 16, New York

ADMINISTRATION

organic phosphate insecticide for agricultural use under the name Systox.

Chemagro charged that the Chemical Formulators had purposely adopted the name Systoban in an effort to cut into the Systox market, cause confusion in the public mind and damage its name and reputation. The firm also asserted that Chemical Formulators played down the toxicity characteristics of its own product, and influenced the public to believe that the chemical character of Systoban is like that of Systox.

Judge Moore agreed that the names of the two products were "confusingly similar," and that Chemagro was entitled to relief.

However, he made no award of damages to Chemagro, and ordered that the litigants split the court costs. In addition to a restraining order, the New York concern had asked for a determination of damages by the court.

More on Offshore Hassle: Louisiana has gained an ally in its lengthy battle with the federal government over ownership of submerged lands in the Gulf of Mexico, a battle that specifically concerns billions of dollars worth of oil lands and may eventually affect offshore sulfur deposits (CW, April 27, p. 56).

Alabama has accepted a U.S. Supreme Court offer extended to four Gulf Coast states to intervene in the dispute. The two states are asking the high court to recognize a seaward boundary of three leagues (about 10½ miles) into the Gulf.

The legal question appears to be, What are the historic boundaries of the Gulf Coast states? The Outer-Continent Shelf Lands Act of 1953 gives the Dept. of Interior minerals development jurisdiction over submerged lands beyond the historic boundaries of the states bordering all three coasts of the U.S.

Louisiana claims its historic boundary extends in some places up to 40 miles into the Gulf. Alabama is claim-10½ miles.

U.S. Solicitor General J. Lee Rankin—supported by Secretary of State John Foster Dulles—told the court that U.S. maritime boundaries long ago were set at three miles offshore; and since 1793 this limit has never been extended.

Whatever line of demarcation the



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by DISTILLATION ... including High Temperature and High Vacuum...

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ADMINISTRATION

Supreme Court establishes, it will affect offshore sulfur deposits such as the Grand Isle Dome six miles out, which Humble Oil and Freeport Sulphur plan to mine, with royalty payments going to the federal government (CW, Sept. 29, '56, p. 21).

LABOR

Conflict on Corruption: The current struggle against alleged corruption and racketeering within labor unions has not directly involved any chemical companies, but it's certain to affect labor relations in some segments of the process industries before the smoke drifts away. For example, there are sure to be some repercussions of concern to employers if the AFL-CIO cuts the Teamsters' union adrift.

In New York City, a Bronx plastics manufacturing concern is in the middle of a spat between the International Union of Electrical Workers and the United Textile Workers, IUE claims to represent about 70 of the J. Radley Metzger Co.'s hourly paid employees and wants to be recognized as the collective bargaining agent. According to IUE, the employees-who are of Puerto Rican ancestry-were dissatisfied with UTW Local 229 because in five years it had not obtained any wage increase for them. In addition, IUE charges that Local 229 has been dominated by labor racketeer Anthony (Tony Ducks) Corallo.

In Washington, the International Union of Operating Engineers has ousted one of its vice-presidents, Victor Swanson, of San Francisco, on charges of corruption. This union represents employees at a number of chemical process plants, particularly in the Southern and Eastern states; and only last week was chosen as collective bargaining agent for 32 men employed at the Magnet Cove Barium Corp. plant at Zavalla, Tex.

Extra Benefits: Process companies are continuing to provide an increasing flow of fringe benefits to their employees. And where certain benefit programs have been in effect for several years or more, the employees' stake is mounting to considerable proportions.

Chairman Rawson Wood, of the Council of Profit Sharing Industries, reports that more than 15,000 U.S.

by cooperative research

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Ammonium Bromide N.F. X. A white powder, very pure, complies with all the requirements of the National Formulary. Commonly used as sedative in pharmaceutical preparations. Also in photography, textile finishing and as fire retardant for fabrics.

Bromine, Dry. A powerful oxidizing and brominating agent used in manufacture of dyes, pharmaceuticals. Many applications in organic synthesis. Low moisture content of 30 ppm permits use in nickel and monel equipment. Very irritating to skin, eyes.

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Cyclopentyl Bromide. A clear, colorless liquid with an aromatic odor. Specially prepared for use in organic synthesis, particularly for introduction of the cyclopentyl radical. Many potential uses in manufacture of pharmaceuticals. Purified grade, 2 degrees C. boiling range.

1, 3-Dibromo-5, 5-dimethylhydantoin. C:H6-Br:02N:. A bromine carrier and oxidizing agent. Useful in synthesis for side chain bromination and bromination of allylic carbon atoms. A fine stable powder with a minimum active bromine content of 54%.

β - Dimethylaminoethyl Chloride Hydrochloride. (DMC). (CH₃)₂ NCH₂CH₂Cl • HCl. A granular solid. Specially prepared for use in manufacture of antihistaminics and other pharmaceuticals. Other potential uses in organic synthesis. Relatively nontoxic in hydrochloride form.

β - Dimethylaminoisopropyl Chloride Hydrochloride. (CH₃): NCH₂CHClCH₃ • HCl. (DMIC). An organic intermediate similar

in appearance and properties to DEC and DMC. Specially prepared for manufacture of analgesics and other pharmaceuticals. Other potential uses in organic synthesis.

γ - Diethylaminopropyl Chloride Hydrochloride. (C:H₂): NCH:CH:CH: • HCl (DEPC). A light tan to white crystalline hygroscopic solid. Used in pharmaceutical manufacture, especially for introduction of the diethylaminopropyl radical.

γ - Dimethylaminopropyl Chloride Hydrochloride, (CH₃): NCH₂CH₃CH₃CH · HCI (DMPC). A white powder of singular purity. A versatile intermediate for pharmaceutical and organic syntheses, available exclusively from Michigan Chemical.

Ethyl Bromide. A clear, colorless, volatile liquid, specially prepared for use as an intermediate in organic synthesis. Practically free from impurities; has a narrow boiling range. Used in manufacture of dyes, perfumes and pharmaceuticals.

Hydrobromic Acid. A clear, colorless or light amber colored fuming liquid. Used for manufacture of inorganic metal bromides, aliphatic bromides, pharmaceuticals, dyes and intermediates. 48% acid and other strengths.

Magnesium Carbonate, Basic, Technical. Fine, uniform white powder, 325 mesh, bulk density 5.5 pounds per cubic foot. Very reactive. Used for rubber compounding, printing inks, paints, varnishes. Anticaking agent for table salt; conditioning or bulking material for powder formulations.

Magnesium Hydroxide. Fine, white powder, typical assay 96.3%, low in moisture, iron, alumina, silica. Technical and NF X grades. Special bulk densities available in NF grade. Convenient material for manufacture of light magnesias, other magnesium compounds.

Magnesium Oxides. Six principal grades of Michigan magnesium oxide with wide range of desirable physical and chemical characteristics covering principal uses of MgO, including rubber compounding, rayon manufacture, ceramics, glass, refractories, insulation.

Methyl Bromide. A heavy, colorless liquid, vaporizing at 40 degrees F., nonflammable and poisonous. Highly penetrating and insecticidally effective fumigant. Also used in organic synthesis for the introduction of the methyl group, especially in preparation of certain pharmaceutical chemicals.

Monobromobenzene. Clear, colorless, heavy liquid. Specially prepared for use as an intermediate in preparation of organic compounds. For introduction of the phenyl radical and in Grignard-type reactions. A pure material with a 2 degrees C. boiling range; specific gravity 1.495.

Phosphorous Tribromide. Brominating agent. A liquid, boiling point 173 degrees C., which fumes in contact with moist air. Used in synthetic work to convert alcohols to bromides, and acids to acyl bromides. Specially useful in preparation of bromides from alcohols without rearrangement.

Potassium Bromate, Granular. A fine, white, granular or crystalline material 99.5% pure. Decomposes at 370 degrees C. with evolution of oxygen. Strong oxidizing agent, used as an analytical reagent. Neutralizer in permanent wave compounds.

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Potassium Bromide, N.F. X. Pure, white granular powder. Low in chloride, passes all N.F. requirements. Widely used in the preparation of photographic emulsions, and in lithograhy. One of the most important sedatives. Available in several granulations.

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Tetrabromophthalic Anhydride. C₈Br₄O₈. High molecular weight phthalic anhydride having a bromine content of 66%. Will undergo most of the reactions of phthalic anhydride. Pale yellow crystalline compound melting point minimum 265°C.

Trimethylene Chlorobromide. Clear, colorless liquid used in manufacture of anesthetic grade cyclopropane. Greater reactivity of bromine atom makes trimethylene chlorobromide specially useful also in preparation of gamma chloro compounds. Boiling range 2 degrees C. maximum.

Zinc Bromide Solution, Optical Grade. Clear, colorless solution, about 80% ZnBr2. Used in laboratories dealing with radioactive chemicals as a radiation viewing shield; the most satisfactory material. Meets all chemical and optical specifications of Argonne National Laboratory.

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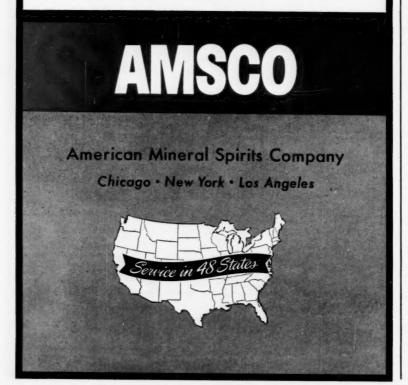


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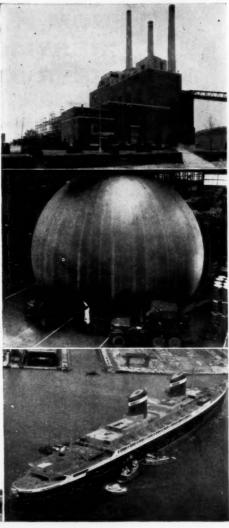
Wood: For profit-sharing cause, 746 new converts in first quarter.

companies now have profit-sharing plans covering more than 5.5 million employees, and that 746 new profitsharing plans were approved by the U.S. Internal Revenue Service during the first quarter of this year. One instance of how such plans are working out in the process industries: The Profit Sharing Fund for employees of United Wallpaper, Inc. (Chicago) now has a total value of \$5.4 million, having been augmented during the past fiscal year by \$221,000 in deposits by participants, \$343,000 in company contributions, and \$102,000 in income from investments.

Diamond Alkali Co. (Cleveland) is launching a voluntary personal thrift program aimed at assisting employees to provide greater economic security for themselves and their families. Over a three-year period, each employee will be allowed to save up to a maximum of \$3,600 through regular payroll deductions, and these savings will draw 5% interest. Participants will have the option of investing their savings in Diamond common stock at 95% of the Sept. 4 closing price.

Plax Corp. (Hartford, Conn.) is starting a new educational program designed to encourage employees to continue their education and training with a view toward advancement in the company. Under the plan, the company will pay half the cost of tuition for employees taking formal instruction in their respective fields.





Above: "Buffalo" Fans supply air for Socony-Mobil Building. Above right: Hundreds of power plants depend on "Buffalo" Draft Fans. Center: Radomes inflated by "Buffalo" E Blowers. Lower right: S.S. United States ventilated by "Buffalo" Fans.

FAN · tas'tic adj. Imaginary, unreal ... Webster

The variety of jobs done by fans today might seem fantastic. Small "Buffalo" Type "E" Blowers inflating radomes to shelter radar in the Arctic. "Buffalo" Fans supplying all the air to ventilate the world's fastest ocean liner and the world's largest air conditioned office building. "Buffalo" Fans delivering tons of air at high temperatures and pressures for generating power. These are just four examples.

Every air job is different — yet all volume, pressure, temperature and installation requirements are met exactly by built-to-order "Buffalo" Fans.

80 years' experience, plus full engineering, testing and manufacturing facilities are your assurance of *every* air job well done when you call on "Buffalo" and its *complete* line of fans.

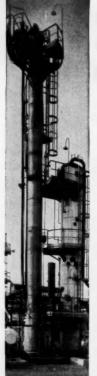


BUFFALO FORGE COMPANY

BUFFALO, NEW YORK

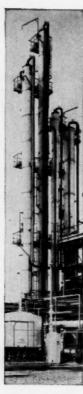
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

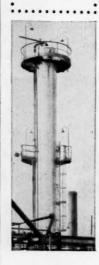


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ADMINISTRATION

KEYCHANGES

Allan B. Clow and Anthony C. McAuliffe, to vice-presidents, American Cyanamid Co.

Robert E. Grant, to vice-president, finance, Plough, Inc. (Memphis).

W. B. Copeland, to vice-president, Plant Food Division, Olin Mathieson Chemical Corp.

Robert L. Fielding and John A. Lunn, to directors, UBS Chemical Corp. (Cambridge, Mass.).

J. R. Wagner, P. H. Richey, F. M. Mansfield III and Bruno Leonelli, to directors, Wagner Brothers (Detroit).

Howard Ellerhorst, Jr., to vicepresident and director of sales; Harrison F. Rowbotham, to vice-president in charge of sales promotion; and George Beesley, to vice-president, finance; Angier Adhesives (Cambridge, Mass.), division of Interchemical Corp. (New York).

Harry D. Feltenstein, Jr., to financial vice-president and chief financial officer, Lithium Corp. of America (Minneapolis).

Paul V. Malloy, to vice-president, operations, Kemet Co., division of Union Carbide Corp.

ASSOCIATIONS

Malcolm M. Renfrew, research director, Spencer Kellogg and Sons (Buffalo, N.Y.), to chairman-elect, Chemical Marketing and Economics Division, American Chemical Society.

KUDOS

To Frank E. Brown, professor of chemistry, Iowa State College, the 1958 Scientific Apparatus Makers Award in Chemical Education, administered by American Chemical Society.

To William G. Gordon, supervising chemist, Eastern Regional Research Laboratory (Wyndmoor, Pa.), U.S. Dept. of Agriculture, the 1958 Borden Award in the Chemistry of Milk.

DIED

Roy Kienle, 61, chemist and director of research, American Cyanamid Co., at Stamford, Conn.





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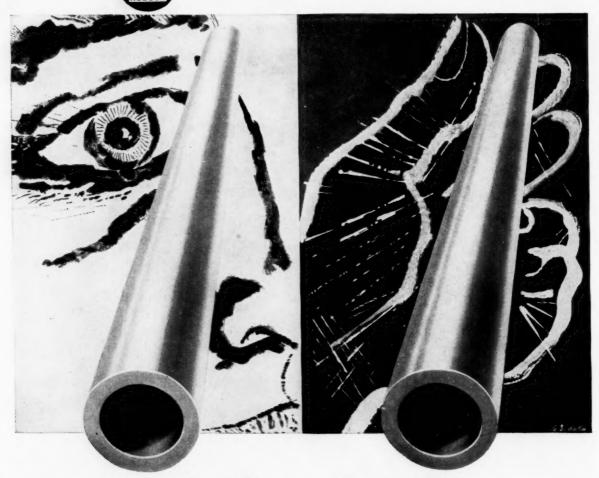
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For instance, these two lengths of plastic pipe, when new, have the same appearance, the same "feel", even the same weight. Both are used to carry the same corrosive chemicals. Yet one pipe failed in just a few months—the other pipe still shows no sign of wear after several years of service.

What's the difference? The *long-life* plastic pipe (on the right) is Uscolite®, and that means *quality*—the use of undiluted virgin resins, superior extrusion techniques, precision dimensions, quality control all the way.

When you order Uscolite—either Uscolite CP (modified alloy) or Uscolite RV (polyvinyl chloride)—you're getting plastic pipe with a reputation that has been proven by 8 years of service. And in all that time, not one foot of Uscolite Pipe has ever been replaced.

For your next plastic pipe and fitting installation, select carefully—select Uscolite. A complete line of pipe and fittings (including unique UscoWeld® fittings) plus the assistance of trained sales engineers who know plastics—is available at the 28 "U. S." District Sales Offices, at selected distributors, or contact us at Rockefeller Center, New York 20, N. Y. In Canada, Dominion Rubber Co., Ltd.



Mechanical Goods Division

United States Rubber

Technology

Newsletter

CHEMICAL WEEK
September 21, 1957

Dow will make linear polyethylenes. It's going to put up a plant at its Bay City, Mich., division, described only as a "multimillion-dollar" production unit. It will use the Ziegler process.

One of the early Ziegler licensees, Dow has been piloting the process for two years, plans to make a major effort in the field.

Dow has also developed a new solvent extraction process for making uranium tetrafluoride, a key intermediate for uranium metal and uranium hexafluoride. The work was detailed at a meeting of the American Mining Congress at Salt Lake City last week.

Dow's process eliminates several big steps in the normal processing approach. It extracts uranium chloride anion complex from high-chloride liquors (as produced by normal ion exchange or solvent extraction processes). Hydrofluoric acid is added to the solvent phase to precipitate uranium tetrafluoride "green salt."

The trick was to find an extractant that had sufficient affinity for uranium and that would not react with impurities. Such impurities would contaminate the uranium tetrafluoride—a material that must meet exacting Atomic Energy Commission specifications. Dow will not disclose the compound it found to fill the bill, other than describing it as an "anion exchange type of reactant."

Dow has operated the process on a bench scale, sees it as being "technically sound." But it would have to be piloted before any real economic evaluation could be made.

A new method of making metal chlorides has been developed by Alfred Koester in Germany. He has found it possible to form chlorides of silicon, ferrosilicon, titanium and boron by grinding them in a special mill, eliminating air when passing chlorine over the metal. He explains that the mill used must be one that can produce free metal radicals. He used a Vibratom mill made by Siebtechnik GmbH (Muelheim-Ruhr). Yields are reported as "far over 90%."

A two-component lacquer that uses synthetic rubber as one of the components is the latest achievement of T. Goldschmidt AG. (Mannheim-Rheinau). The rubber is said to be vulcanized by air. The lacquer, called Protegol, is said to form "silk-bright" rubber films with top-notch chemical and mechanical resistance.

Use of turbine aeration to boost dissolved oxygen content of streams looks promising. The idea, put forth a few months ago (CW Technology Newsletter, June 8), is to whip air back into water, the dissolved

Technology

Newsletter

(Continued)

oxygen content of which has been depleted by oxygen-grabbing chemicals discharged to streams.

Concludes the Sulphite Pulp Manufacturers' Research League: the technique indicates that it's possible to raise the dissolved oxygen content from 0.15 to 1.5 parts per million—depending on conditions that prevail. Right now, turbine experiments at some mills are adding as much as 5 tons of oxygen daily to rivers.

The research league cautions that use of turbines might not be practical in some mills and that further study of added costs, brought on by possible power loss and damage to equipment as a result of adding air, might make it "economically unsupportable."

A completely automatized process for making shaped ceramics has been developed by researchers of Alfred University (Alfred, N.Y.). Such articles are now dried and fired in units, each of which must be handled separately. Alfred's Leon Coffin has set up a continuous method starting with an extruder that shaped the clay. Clay shapes are fed into a drying machine, where they are rotated on a belt. From there, the bricks or tile go into a circular tunnel kiln, where they're fired.

A new oral penicillin is making its debut this week. Eli Lilly is bringing out its V-Cillin K (Penicillin V Potassium), which in clinical tests has achieved higher blood levels faster than did any other oral penicillin. The secret: the tablet disintegrates in stomach acids within approximately five minutes, but the compound is soluble and stable in the intestinal tract.

Tests indicate that high therapeutic levels are attained within 15 minutes; responses noted have been comparable, says Lilly, to parenteral administration of Penicillin-G.

Du Pont will make film from Teflon 100-X, its experimental Teflon resin. Sample quantities of the new film will be available as soon as the company completes its abuilding semiworks unit for making the resin.

Du Pont sees the new product as complementing its line of industrial and packaging films (e.g., Mylar polyester, cellophane). It points out that the fluorocarbon version will always be more expensive than, say, Mylar. But it sees the film as carving a niche for itself because it is able to withstand high temperatures (400 F under continuous service) and because of its good electrical insulating qualities. But though high-temperature electrical applications look promising, Du Pont says, its film should also find work as a tank liner and in specialized container applications where Teflon's recognized corrosion resistance will be important.

Du Pont's production facilities for the 100-X won't be completed until 1959.

NOTE THESE 11 MAJOR PRODUCT GROUPS FOR WHICH STAUFFER IS A LEADING SOURCE OF SUPPLY

Stauffer is the country's largest or second largest producer of several industrial chemicals, a leading producer of many, the only producer of some.

The experience of many years as a major source of supply equips us to be a major source of assistance to manufacturers needing information on the application of these basic chemicals.

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Animal Charcoal Animal Glue

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Sodium Hydrosulfide

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Cream of Tartar

Stauffer has 50 manufacturing plants widely distributed throughout the United States and Mexico. These offer broad flexibility in supplying both normal and extraordinary requirements. No Stauffer customer, for example, has ever run out of Carbon Bisulfide. Advise us if Stauffer and its immense facilities for Research and Production can be of help to you.

Informative Stauffer publications on Sulfur, Boron Products, Chlorinated Hydrocarbons, Hydrofluoric Acid and Metallic Chlorides are available on request.

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PRODUCTION



At Houston-scene of tough antipollution measures-plant managers can see how well they're doing.

Pollution Survey Helps Clear Houston Air

Sometime this week, more than one chemical plant manager will likely receive a phone call regarding the air pollution nuisance—real or imagined—caused by his plant. When he does, these questions are bound to be among those to cross his mind: (1) How much of the pollution is really coming from my plant? (2) Just how bad is pollution in the area, compared with that in other areas of the city? (3) How does the city's air pollution stack up against that in other cities?

But, if the plant in question is located so that the manager can see the Houston skyline (above), he will have most of the answers at his fingertips. They are in the 151-page summary report covering the first phase of Southwest Research Institute's air pollution survey of the Houston area completed this summer. The \$160,000 study, undertaken for the Houston Chamber of Commerce (CW, May 26, '56, p. 71), is now in the final phasea \$35,000 confirmation survey. And unless the confirmation causes the results to do a complete somersault (which is unlikely), the study offers

the plant manager solace, and the public reassurance, that pollution measures already taken by many plants have not been in vain.

But there are implications in the study for the rest of the country, too. It will, of course, help to give other areas a yardstick for measuring their own air pollution. Possibly more important, the study offers an object lesson in how to study air pollution.

Who's to Blame? Although Houston industry—heavily loaded with chemical plants and oil refineries—does not get complete absolution, the SRI survey shows that the city compares favorably to other cities that have air pollution control programs. This survey is a far cry from the once-undisputed figures that two years ago caused 54 firms (including at least 20 chemical and chemical process plants) to be haled into court as defendants in a suit asking that the firms be enjoined from causing air pollution (CW, Nov. 26, '55, p. 48).

Controls, and More: The survey is a much more valuable tool for the future, however, than for confirmation

of the controls already instituted. As Ben C. Belt, president of the Houston Chamber of Commerce, points out, it "establishes a benchmark against which trends in air pollution may be measured in the future."

Belt offers the report as an aid to local control authorities. They, as well as plant managers, should find the welter of facts and figures helpful in assessing the need for further controls. Too, firms considering the area as a site for a new plant will have fingertip facts they could not hope to compile themselves.

Included in the survey is a thorough meteorological study. SRI drew on Weather Bureau records of the International Airport, Ellington Air Force Base and the Houston weather station, received approximately 190,000 punched cards from the U.S. Weather Bureau's National Weather Records Library at Asheville, N.C., to study the different weather situations that affect atmosphere pollution. In addition, it ran its own studies of temperature and relative humidity structure of the atmosphere from ground level to

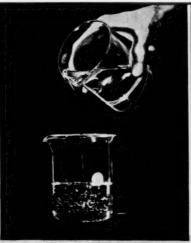


ATLA

CHEMICALS DIVISION

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Crystalline sorbitol is available in pellets as shown here, or in powder form, less than 1% moisture.

ARLEX, Atlas industrial humectant solution, is non-SORBO 70% sorbitol solution is most economical, here, or in powder form, less than 1% moisture.

Crystallizing, viscosity is 16 times that of SORBO. high purity product—meets N. F. Specifications.

Choose the conditioner qualities you need from the line of ATLAS sorbitol products

When you're making a product that needs plasticizing or protection against moisture changes, you're likely to find the right combination of performance, properties and price in the family of sorbitol products that Atlas makes. If you make confections, cosmetics, liquid pharmaceuticals, adhesives, tobacco, printer's rollers, or inks—one of the following products will probably match your requirements and save you money. Any of the four may be used alone or in combination with sugar systems, glycerin or the glycols.

For high purity at lowest cost

Sorbo®-70% sorbitol solution-is the sorbitol product we usually recommend for use in confections and pharmaceuticals, as well as most other industrial applications. It's our top purity sorbitol liquid product, and at the same time our lowest priced. It meets the Toilet Goods Association standard. And it's the original sorbitol product meeting National Formulary specifications.

During our more than 20 years of manufacturing sorbitol, we have constantly refined manufacturing techniques to assure you of getting high purity, and getting it all the time. Extreme uniformity is assured because Sorbo is made by a continuous process, under SQC (statistical quality control) methods-Atlas being a pioneer in the application of these methods to chemical-making.

For increased resistance to crystallization

Sorbitol Special is often recommended where you need extra resistance to crystallization, as compared to the purer and more economical Sorbo . . . for example where the humectant plasticizer spreads over a surface as in conditioning paper or fiber. Sorbitol Special is a 76% solution of sorbitol and its anhydrides, the latterincreasing solubility and lessening crystallizing tendency. Its viscosity is almost three times that of Sorbo.

For extreme conditions

ARLEX® is our non-crystallizing industrial humectant solution, recommended for extreme conditions of use where greatest resistance to crystallization is required. It is an 83% solution of sorbitol, its anhydrides and other polyhydric derivatives of sorbitol. Its viscosity is over 16 times that of Sorbo.

For compounding

Crystalline sorbitol, in powder or pellet form, is used principally for chemical synthesis, tableting and compounding, rather than conditioning. It is similar to Sorbo in purity, but has less than 1% water content.

Technical assistance by Atlas can help you determine which of these products best fits your requirements. Our many years of pioneering experience are ready to serve you in applying these versatile materials to hundreds of uses. Write for data, samples and consultation.



Sorbo and other Atlas sorbitol solution products are supplied in 55-gallon lined steel drums-also in 1 and 5-gallon cans, and in tank cars.

Tip for designers-

get extra performance, new savings with Atlac Thermaflow molding compounds

If you're designing metal or plastic parts, investigate the improved characteristics that you can get with Atlac Thermaflow reinforced polyesters. Here are just a few examples:



Lighter weight

This bucket molded of Atlac Thermaflow reinforced polyester weighs only one-third as much as steel or cast iron... yet it's amply strong to carry limestone on a conveyor.

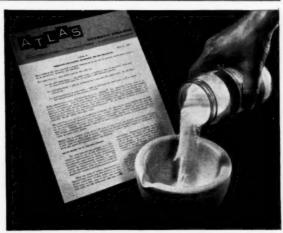
Corrosion resistance

The body of this valve is molded of Atlac Thermaflow material, which withstands attack by many acids and alkalies better than stainless steel.

Simplified assembly

Molding this 12-inch long contact assembly in one piece of Atlac Thermaflow, with metal inserts molded in place, makes one piece do the work of three...cuts assembly costs.

These versatile materials are available in numerous glass fiber and nylon rag reinforced grades with a wide range of superior electrical, physical and chemical properties. Write for data and samples.



Arlacel® 161 non self-emulsifying g.m.s. offers interesting advantages in cosmetic formulas. New Atlas bulletin tells the hows and whys.

New methods of using Glycerol Monostearate shown in latest cosmetic bulletin

As part of the expanded Atlas program for helping cosmetic formulators, we've just published a bulletin on formulating with glycerol monostearate (non self-emulsifying). This bulletin discusses all types of glycerol monostearate, including self-emulsifying and acid-stable. It shows how Arlacel 161, a non self-emulsifying type developed by Atlas, can be advantageously used "across the board" in formulations which traditionally call for self-emulsifying or acid-stable g.m.s. Many typical guide formulas are shown.

In standard soap-type formulations, where non selfemulsifying g.m.s. is commonly used, Arlacel 161 offers exceptional purity and uniformity by comparison with usual materials of this type. It is made in the world's largest and most modern monoglyceride plant by Statistical Quality Control techniques which virtually eliminate possibility of variation between batches.

Write to Atlas today for your copy of this bulletin. Ask for CD-113. And see your local Atlas representative for full facts on how the Atlas 4-Point Program can help you formulate new products more easily and more economically.

COOEt OH
$$CH_2$$
 — CH_2 — $COOEt$ CH_2 — $COOEt$ $COOEt$

COOE: NH
$$CH_2 + RC$$
 CH_2 CH_2 $COOE: NH_2$ $COOE: NH_2$ CH_2 CH_2 CH_2

MALONATE

$$\begin{array}{ccc} \text{COOE}_{1} & & \\ & \text{CH}_{2} + \text{KMnO}_{4} & & \\ & & \text{COOE}_{1} & & \\ \end{array}$$

COOE:

$$CH_2 + \phi CH = CHCCH_3$$
 ϕCH_2
 ϕCH_2
 CH_2
 ϕCH_2
 CH_2
 CH_2

SPECIFICATIONS

purity 99.0% minimum
nitrogen .01% maximum
acidity 0.1% as malonic acid

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PRODUCTION

as high as 500 ft. throughout the year.

These studies indicate that the prevailing winds and atmospheric conditions constantly flush out the air, keep it clean. But they also show how occasional pollution problems occur in local areas when the prevailing winds mix the pollutants.

Many pages of the report detail pollution sampling techniques and analyses as well as the results for each section of Harris County.

Vegetation studies are not complete, but certain conclusions have



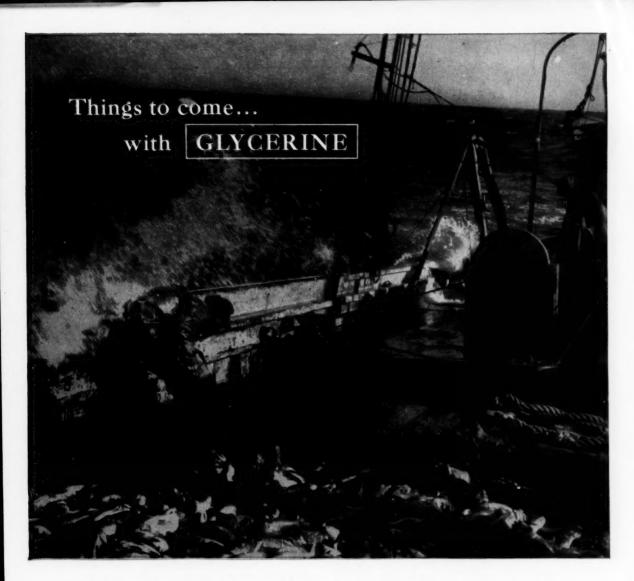
Houston's Belt: 'The only way to have no air pollution at all is to have no industry at all, or no city at all.'

already been drawn. There is evidence of sulfate damage to ash and elm tree leaves in certain areas.

Odor problems were noted. And although disagreeable odors were often the only sign indicative of air pollution, an analysis was not possible for lack of a satisfactory test method.

Pollution and Health: The big question left unanswered by the SRI survey in Houston: What effect does air pollution have on health? But then that's a question that hasn't yet been satisfactorily answered by any survey.

The U.S. Public Health Service and other groups are researching the question right now. John J. Phair, of the University of Cincinnati's Medical School, an authority on the subject, has made three surveys so far. He is still trying to work out a statistical method of correlating air pollution with public health. He says: "We know how to measure air but not how to measure man in relation to it."



"Auto-mersion" freezing may go to sea

Glycerine in immersion freezing processes can provide important advantages for fast automatic freezing. Adapted to commerical fishing vessels, such "automersion" may well enable the fisherman to preserve fish within minutes of the time of catch.

The ideal refrigerant liquid in such a process is one based on Glycerine—with its unique combination of low freezing point and nontoxic properties in solution. The unwrapped products can pass directly through the refrigerant, will emerge separately frozen, will not fuse into a solid mass. Salt or other acceptable additives may give extra preserving power to the freeze solution.

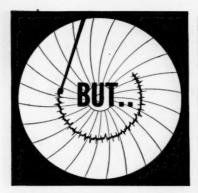
Glycerine has already been applied in solutions for freezing by direct contact, experimentally here—commercially abroad. In other types of food applications its acceptability has long been a matter of record.

Glycerine's usefulness continues to grow. Stable in price, dependable in supply, Glycerine offers processors a unique balance of properties: it is hygroscopic, nontoxic, stable, nonvolatile, with excellent solvent power and agreeable taste. New applications for Glycerine are extending its use in foods, pharmaceuticals, coatings, packaging and many other fields. For a useful 20-page booklet, "Glycerine Properties and Uses", write to:

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Is Solvent Recovery Practical?

You bet it is! With a solvent recovery system, practically all kinds of volatile solvents and solvent mixtures can be recovered safely, efficiently, and economically. So, solvent recovery is practical because it means increased profits.

Here's why:

- The initial cost of a solvent becomes a secondary consideration. High priced solvents can be used at no extra operating cost.
- Solvents can be reused indefinitely.
 During periods of solvent shortages, efficient recovery is invaluable.
- Fire and health hazards are reduced and you have a closer check on solvent evaporation rates.

Solvent recovery plants are designed to suit your particular needs whether 50 or 100,000 gallons a day. In most cases, solvents can be recovered with an efficiency of more than 99% at a cost of 1 to 2¢ per pound. The investment is moderate too. Some recovery plants running at capacity pay for themselves in less than a year. Under other conditions, it takes only two or three years.

CARBIDE has much more information on how a COLUMBIA Activated Carbon Solvent Recovery plant can cut your processing costs. Write now!

UNION CARBIDE CHEMICALS COMPANY

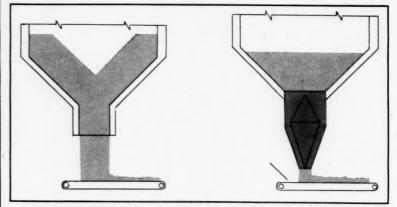
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"Columbia" is a registered trade-mark of UCC.



New device (right, in color) eliminates bin funneling (left).

Baffle Beats Bin Problems

In Columbus, O., this week, the first full-scale bin for testing the Easy-Flo bin orifice (above, right) will be completed.

The bin is Bituminous Coal Research Inc.'s (Pittsburgh) new attack on the perennial problems of funneling, rat-holing, arching and clogging of solid materials as they flow from storage bins.

Although BCR's test experience has been mainly with coal, it says the Easy-Flo bin orifice will handle most any solid material. Only stipulations: that it is not too fine or sticky.

With coal, ½ x0-in. material— the ½-in. and smaller size—with up to 15% surface moisture has been handled without problems in a 14-ft.-high test bin. The scale-up will be to a 40-ft.-high, 10-ft.-diameter bin. And, if tests in the larger bin prove as successful, BCR has high hopes of attracting the attention of equipment manufacturers, licensing them to produce the device.

Plan of Attack: BCR recognized that one variable was most significant in causing bin-unloading troubles: pressure buildup at the bin orifice. After testing pressures at various points throughout the bin, BCR came up with an orifice design that keeps compacting pressures from building up, prevents even the smallest size of coal from compressing to clog the bin opening. BCR explains it this way: snow remains light and fluffy until it's packed into a snowball; eliminate the pressure buildup, and there's no hard packing.

As perfected, the device bears a superficial resemblance to a jet engine. It consists of a steel outer shell that surrounds a double-cone baffle. Material flowing from the bin passes between baffle and shell.* There are no moving parts to complicate maintenance.

The model used for the test bins has a 3-ft. diameter at the top, where it is attached to bottom of the bin. Its 7- to 9-ft. length tapers to a 1-ft. orifice, where pressure is so low that one man can operate a manual shutoff, eliminating the need for heavyduty valves. (BCR says the device can be modified to meet specific bin and material applications.)

Flow—from a few pounds/hour to 7,000 lbs./hour—is regulated by adjusting the speed of the conveyor taking the material away from the discharge point. The low pressure at the orifice results in a sensitive cutoff of material flow without the use of a valve when the conveyor is stopped and material begins to pile up at the orifice. And, the elimination of compacting-pressure buildup means that flow, proportional to the conveyor speed, starts as soon as the conveyor is again set in motion.

If the Easy-Flo bin orifice lives up to advance notices, it may provide welcome relief to some of the chemical industry's solids-handling headaches as well as those of the coal industry.

"A technical paper giving design and test details will be presented by BCR at the joint meeting of American Society of Mechanical Engineers and American Institute of Mining Engineers, Oct. 10-12 at Quebec, Can.

PAPER and PAINT improve when 4 millionths of an inch is **BIG**

This is a microphotograph of one of Koppers new FORTIFIED styrene-butadiene latices. Even the largest particles in these improved DYLEX* latices measure no more than 4 millionths of an inch; most of the particles are far smaller. This small particle size promises major improvements . . .

in paint, FORTIFIED DYLEX K-34 provides improved pigment binding strength, improved adhesion, and scrubbability. It can be used in combination with long oil alkyds, with proteinacious or cellulosic water-soluble resins and other styrene-butadiene latices.

in coated paper, FORTIFIED DYLEX K-52 improves the flow of casein, or starch base coatings, during application. It gives the starch batter water resistance and retards picking. It increases the smoothness, gloss, and wet-rub resistance of coated papers, and improves their printability.

Write for technical literature describing these latices and the new catalog of synthetic chemicals manufactured by Koppers. There is no obligation, of course. Koppers Company, Inc., Chemical Division, Dept. CW-97, Pittsburgh 19, Pennsylvania.

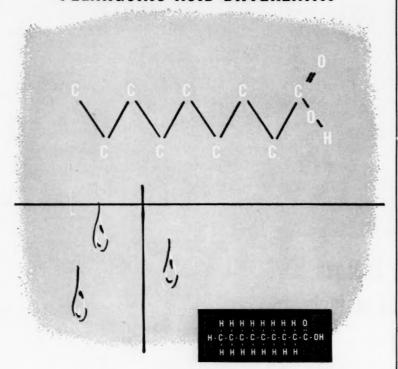
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PRODUCTION

New Check for Fuels

Refiners, out to get military aviation fuel contracts, now have a new, simplified method of checking conformance of their fuels against military specifications. And the rest of the chemical process industries have an object lesson in how materials-testing procedures can be simplified.

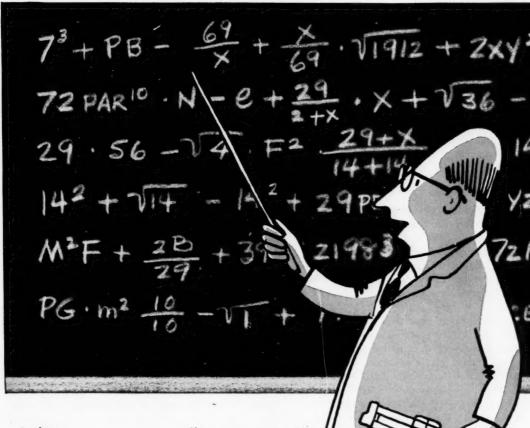
The method, developed by the National Bureau of Standards for estimating the net heat of combustion from the weight percent of hydrocarbon types found in the fuel, eliminates elaborate calculations, extensive analytical work and complex test equipment. Key: exacting specifications assure that the hydrocarbons of which the fuel is composed will be limited to a small group of related compounds within each hydrocarbon type.

Therefore, the range of heat of combustion values is considerably less for a fuel that meets specifications than for one that does not, and mixtures within a group have a characteristic heat of combustion per unit weight that does not vary greatly from one fuel sample to another. NBS chemists then concluded that the heat of combustion would be a linear combination of the percentages by weight of the hydrocarbon types in the fuel.

Working It Out: In making the tests, the chemists first determined the amounts of olefin and aromatic saturates in the fuel by silica gel adsorption. Next, the olefin and aromatic saturates were analyzed for paraffins and naphthenes. Using the method of least squares, the measured heats of combustion were then fitted to a linear combination of the percentages of the four saturate fractions.

NBS doesn't claim that its method is foolproof. The equation is empirical, sensitive to variations between classes of fuels. Still, in tests of 40 typical aviation fuel types, the method showed less deviation in results than previously proposed ways to determine heat of combustion, using the linear relationship. The standard deviation was 0.07%, compared with 0.12% for the method giving results closest to it-a U.S. Navy Bureau of Aeronautics method relating heat of combustion to aniline-gravity.

The ideal test would be a complete analysis and calculation-"Theoretically possible, but not feasible at present for most refineries," says NBS.



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Over the past fifty years, we have spared no effort to prove to our customers that ours is an exceptional concept of service when it comes to supplying white oils, petrolatums and petroleum sulfonates.

As proof of this contention, we have grown steadily, until today we are among the world's largest *specialists* producing these products. As such . . .

- —we have a wealth of experience accrued over many years that we are ready to place at your disposal.
- —we maintain laboratory facilities to help our customers solve their individual problems.
- —we offer a wide range of these products—and will tailor-make them, if necessary, to meet your specific requirements.

... That our concept of service fits in with your needs, we stand ready to prove . . . if you will but telephone, wire, write, or fill in the coupon!



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General Information on White Mineral Oils" I.R. Bulletin "A"	
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What can you do to help me solve this problem?	
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Name	
Company	
Address	

EQUIPMENT

Heavy-Duty DC Power: Perkin Engineering Corp. (El Segundo, Calif.) says flexibility makes its new Model S125-200 25-kw. silicon-rectifier a good choice for applications calling for heavy-duty dc. power. The unit can be connected either in series or parallel, or series and parallel. The dc. output is 125 v. (nominal) at 200 amps. or 250 v. (nominal) at 100 amps. The ac. input: 208, 230 or 460 v., 60 cycles, three phase. Efficiency: 94%; power factor: 95%.

Immersion Thermostat: A new low-cost immersion-type thermostat for close control of temperatures to 300 F is now offered by Alloy Bellows, Inc. (Cleveland). The thermostat is sensitive to a fraction of a degree, sufficiently rugged to withstand temperatures beyond the calibrated range. Thermal element is bimetallic; desired temperature is set by turning a knob.

Dehydrators: Selas Corp. of America (Dresher, Pa.), builder of custom dehydrators, is out with a new standard line of steam-reactivated dehydrators for drying instrument air and process gas. The units come in 11 sizes with capacities from 10 to 1,000 cfm. of air, offer a choice of manual-, semiautomatic- and automatic-cycling models. All models operate on an 8-hour reactivation cycle—manual and semiautomatic models require attention at the end of cycle only. Maintenance can be accomplished without disturbing the steam coil. Units use diaphragm-operated steam valves in place of solenoid valves, are constructed for 250-psi. service.

Pressure Transducer: The new Type 4-317 pressure pickup of Consolidated Electrodynamics (Pasadena, Calif.) permits accurate measurements to 5,000 psig. at temperatures in the -350 F to 600 F range; temperatures as high as 750 F are allowable for short periods of time. Sensing elements are unbonded strain-gauge windings connected in a four-arm bridge. Pressure against the diaphragm produces displacement of sensing element, changes resistance of active arms to cause an output proportional to the applied pressure. The unit is 5% in. in diameter, 34 in. long, weighs 30 grams.

Hot-Oil Furnace: Cleaver-Brooks Co. (Milwaukee) has introduced a new direct-fired oil heater for heating heat-transfer oils and liquids to 600 F. Forced circulation provides high-velocity flow, eliminates hot spots, coking or deterioration of the heat-transfer oil. Burners for gas, oil or gas-oil combination are available. The unit has been dubbed Industrial Peak-Temp Oil Heater.

Flow Colorimeter: A ratio-recording flow colorimeter for the continuous analysis of any color in the visible spectrum is a new offering of the Process Instruments Division, Beckman Instruments, Inc. (Fullerton, Calif.). The ratio-recorder is said to measure color wave-length

accurately from 350 to 1,000 millimicrons in the presence of turbidity or entrained gas. Keys: specially designed light-beam splitter that's based on principle of a single-beam instrument, relative insensitivity to source variations and accumulation of foreign matter on the cell windows of the analyzer section. Unit is available in 1- to 100-cm. colorimeter path lengths, packaged in conventional or explosionproof housings. Potential applications: control of chlorine, nitrous oxide, bromine; color control of shellacs and plastics.

Cottrell-Precipitator Control: Western Precipitation Corp. (Los Angeles) has recently introduced the Transistomatic, a new automatic control unit for adjusting the voltage of its Cottrell precipitators to the fluctuating characteristics of the process gas stream (i.e., moisture, dust loading, etc.). Transistomatic provides continuous pinpoint control of voltage, improves Cottrell efficiency, since efficiency depends on placing the maximum-possible voltage (short of flashover) on the gas stream. WPC includes a lifetime guarantee with the Transistomatic control unit.

Diaphragm Spray Nozzle: A spray nozzle equipped with a manually operated diaphragm valve to provide independent shutoff on manifold installations is a new offering of Spraying Systems Co. (Bellwood, Ill.). To close the spray nozzle, a shutoff screw is turned down; a wing nut holds it tightly in place against the diaphragm. The nozzles are made of brass, have internal Monel strainer, come in a wide choice of interchangeable orifice tips.

Relief Valve: Farris Engineering Corp. (Palisades Park, N.J.) minimizes galling and corrosion problems in its line of boilers and pressure-line relief valves by use of 17-4 PH (precipitation-hardening) stainless steel for discs and stem retainers. Fabricating costs are relatively low, because the metal is not distorted by heat treatment, does not have to be reworked.

Vibrating-Screen Separators: Three new 30-in.-diameter, vibrating-screen separators in 1-, 2- and 3-deck models are offered by Southwestern Engineering Co. (Los Angeles). The models add an intermediate size to SWECO's 18- and 48-in.-diameter lines. The new separators are constructed of carbon- or 316-stainless steel, and operate with a 60-cycle, 3-phase, 1,200-rpm., ½-hp, 220/440-v. motor. Explosionproof, 50-cycle and 550-v. motors are also available.

Oil Separator: Manufacturers Engineering & Equipment Corp. (Hatboro, Pa.) has recently announced a new oil separator for removing minute amounts of oil that may be present in gas streams. The separator, dubbed Model A, drains the oil down a wick to a reservoir at the bottom of the unit. The unit is recommended for air and nitrogen purge systems.



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National Carbon Company

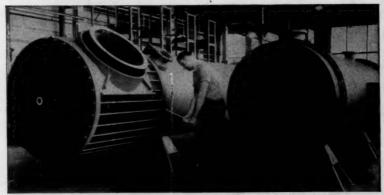
Division of Union Carbide Corporation • 30 East 42nd Street, New York 17, N.Y. Sales Offices: Atlanta, Chicago, Dallas, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco. In Canada: Union Carbide Canada Limited, Toronto

"KARBATE" IMPERVIOUS GRAPHITE SHELL AND TUBE HEAT EXCHANGERS PROVE THEIR ECONOMY IN COOLING CORROSIVE GASES

Gas coolers of "Karbate" Impervious Graphite cost less and last longer than coolers made of less corrosion-resistant materials.



Ten "Karbate" Impervious Graphite Shell And Tube Heat Exchangers cooling and condensing mixtures of organic vapors and hydrogen chloride. Units are arranged in pairs—uninsulated unit in each pair has plant cooling water on shell side; insulated unit is refrigerated.



These standard "Karbate" heat exchangers have 685-%" I. D. "Karbate" tubes assembled between "Karbate" tube sheets in 45" diameter steel shells. Corrosive water-saturated sulfur dioxide gas, which contains considerable entrained sulfuric acid, will enter and leave tube sides through 24" diameter connections on "Haveg" phenolic resin covers.

National Carbon provides complete Technical Service—An experienced technical staff designs and rates "Karbate" Shell and Tube Heat Exchangers manufactured and guaranteed by National Carbon. Dr. D. Q. Kern, well-known consultant and author of Process Heat Transfer, serves as an advisor to this group.

Particularly significant today is the economical cooling of corrosive gases. "Karbate" Impervious Graphite Heat Exchangers have the corrosion resistance, high thermal conductivity, immunity to thermal shock, and moderate cost vital to this service.

For cooling corrosive gases, "Karbate" Exchangers operate either horizontally or vertically, usually with the corrosive gas inside the "Karbate" tubes and with the coolant in the steel shell. These exchangers are furnished with shells of "Haveg" phenolic resin, impervious graphite, rubber or glass-lined steel for operation with corrosive gas on the outside of the "Karbate" tubes.

A complete line of "Karbate" Heat Exchangers is available in sixteen shell sizes from 6" I.D. to 45" I.D. with tube lengths of 6', 9', 12', 14', and 16'. Standard components are carried in stock for immediate assembly of units having up to 3585 sq. ft. of heat transfer surface.

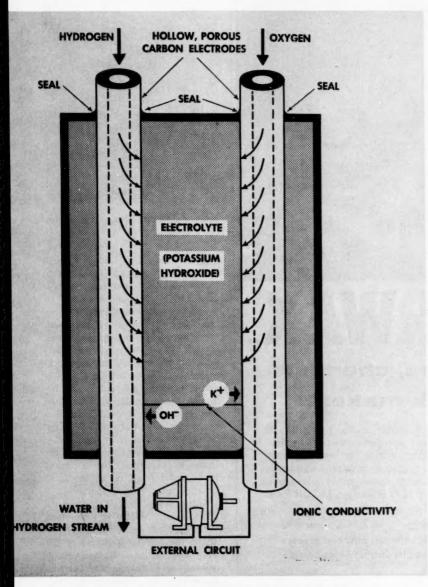
For full details, request Catalog Section S-6800NL



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ENGINEERING



National Carbon's new fuel cell auditions for industrial role.

New Power Package Bows In

Fuel cells are stepping out of the laboratory and into the commercial spotlight this week at Fort Huachuca, Ariz. There at the U.S. Army's electronics proving ground, the Signal Corps is taking the wraps off its newest mobile radar set—the "Silent Sentry"—powered entirely by fuel cells.

Developed and produced by National Carbon Co., the new cell is the first practical device for converting chemical energy of fuels directly into kilowatt quantities of electricity.

The demonstration caps a toppriority project at National Carbon's year-old Parma, O., Research Laboratories (CW, Sept. 22, '56, p. 40), marks the attainment of a goal toward which researchers have been plodding for more than a century. Industrial Qualifications: In theory, the operating principle of the fuel cell is simple, inherently efficient. Hydrogen and oxygen are ionized by electrochemical reaction with an electrolyte within the cell to establish a current flow that can be routed through an external circuit. Not so simple, however, was the development of a device capable of generating usable quantities of electricity under easy-to-attain operating conditions.

The system devised by National Carbon researchers under the direction of Karl Kordesch appears to have many qualifications to recommend it for industrial applications. It's the first fuel cell to operate at normal temperatures and pressures, thereby eliminates the need for costly auxiliary equipment, heavy pressure vessels. It's compact, develops about 1 kw. of power from a packaged unit 1 cu. ft. in volume. And, because it employs no moving parts or exhaustible components (unlike a storage battery, the fuel cell's electrolyte is not depleted by normal operation), the basic unit is virtually maintenance-free.

Of less importance to prospective industrial users—but of primary interest to the military—is the fuel cell's characteristically silent operation, which minimizes chances of detection in the field.

Fuel Efficiency: Though the fuel cell is a supplemental source, rather than a substitute for conventional power supplies, it has several features that should help it compete with other means of generating auxiliary power. For example, direct conversion of chemical energy into electricity utilizes 65-80% of the energy available in the hydrogen-oxygen fuel. A conventional steam-electric generating device using the same fuels as a source of heat, on the other hand, recovers only about 30-35% of the available energy.

By virtue of its light weight, the fuel cell offers an attractive alternative to the use of conventional storage batteries in unelectrified areas remote from recharging facilities. The cell isn't limited to a fixed storage capacity, can supply electrical power on demand as long as fuel is supplied.

How It Works: Secret of the new fuel cell's success, says National Carbon, is the chemically treated hollow,



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A bad paraphrase, perhaps, but it points up the versatility of CASTORWAX. Here's a low-cost synthetic wax of hydrogenated castor oil that is enjoying notable success for many applications—rubber compounding, greases, candles, adhesives, crayons, potting compounds, foundry waxes, mold lubricants, transfer inks . . . to name but a few. Baker's CASTORWAX has these basic characteristics:

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ENGINEERING



NC's Kordesch found key to fuel cell's success.

porous carbon electrodes through which the gases enter. Designed to work at ambient temperatures (normally 120-140 F), approximately atmospheric pressure, the units minimize the loss of energy as waste heat.

In operation, hydrogen diffuses through the negative electrode, liberates electrons as it is ionized by electrochemical reaction with the electrolyte solution of potassium hydroxide. The resulting current flows through an external circuit and back to the positive electrode where the electrons are accepted by the ionizing oxygen. Ionic conductivity through the electrolyte completes the electrical circuit; water produced by the reaction is disposed of by evaporation.

Voltage across the cell is about one volt; current capacity is determined by the physical size of the unit. By varying the number and size of the cells, says National Carbon, many combinations of voltages and currents can be obtained. Basically, however, the fuel cell is best suited to high-current, low-voltage applications.

Flexible Operation: Though lowpressure operation affords obvious advantages for many potential industrial applications, the new fuel cell isn't limited to that range. Electrical output of a given cell varies directly with pressure, can be increased as required by increasing the operating pressure.

A unique feature of National Carbon's device is its ability to operate on impure fuel gases. The new design permits the use of hydrogen of standard commercial purity, substitution of air in place of oxygen for producing

Using Salt Efficiently

by INTERNATIONAL SALT COMPANY, INC.—America's largest producer of salt



How to Store Large Tonnages of Rock Salt in Limited Space

One of the best ways to increase salt-storage capacity, without taking up valuable indoor or outdoor plant space, is to install a "Silo Lixator." Developed by International, this spacesaving unit—which combines salt storage with brine making—is especially practical where storage areas in or around the plant are at a premium.

The Silo Lixator makes excellent use of limited storage space, because it stores rock salt in a high, vertical column. The upper portion of the column stores dry salt. And the bottom of the salt column rests in a dissolving tank, where water is added to make brine. Whenever salt in this tank is dissolved to make brine, it is immediately replaced by dry salt flowing down from the upper portion of the column.

In addition—and this is an important, money-saving feature—there is ample space in the dissolving tank for brine storage. (The brine occupies the voids between the salt crystals.) This method of storing salt—with both dry salt and saturated brine present—is one form of "Wet Storage." It does away with the need for a brine-storage tank.

For storing any given amount of rock salt in dry form, ample space can be provided in the Silo portion, by building it to the proper height. The rugged steel, wood-stave, or prefabricated-concrete construction of the Silo assures long, dependable service.

Rehandling eliminated. Because dry salt stored in the Silo Lixator is dissolved to make brine, there is never any salt rehandling in the plant. A simple piping system, installed where it won't interfere with other operations, carries this brine to points of use. The brine is available simply at the turn of a valve. What's more, every drop of Lixate Brine is completely self-filtered by the rock-salt crystals at the bottom

Rock salt storage capacity varied to suit customer requirements Rock salt is stored automatically in silo Reduces handling costs Storage compartment. Sterling uses wood stave or Rock Salt prefabricated concrete silo Hopper Car Box Car Removable cover plates over screw conveyer trough Controls located adjacent to the Use hopper when dissolving chamb unloading box car SIDE ELEVATION

THIS IS A TYPICAL SILO LIXATOR... built outside a plant so that rock-salt storage is no problem. The unloading method with this Silo Lixator is a screw conveyor underneath a railroad car.

of the dissolving tank. Result: 100%-saturated brine which is always pure and crystal-clear.

Incoming salt shipments need no special handling. One of the more common delivery methods is the one pictured above: rock salt flows directly from a hopper car into a screw-conveyor trough, which, in turn, carries the salt to a bucket elevator. Another unloading method, possible when the elevator boot is low enough to permit gravity feed from the hopper car, is the gravity-feed chute.

Another money-saving feature: the Silo Lixator needs to be cleaned out only once every 12 to 18 months. The clean-out process is very simple: a valve or door is opened at the bottom of the dissolving compartment. All accumulated impurities are flushed through the clean-out, and the Silo Lixator is ready for use . . . needs no further attention for at least another year.

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If you'd like the assistance of an International "Salt Specialist" on any problem concerning salt or brine—or further information on the many Silo Lixator designs—just contact your nearest International sales offset.

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'Silent Sentry' makes first use of portable fuel-cell power.

small amounts of power. The latter is particularly advantageous for small mobile units, says National Carbon, but pure oxygen is required for generating high current densities.

Fuel cells have also been considered as a means of recovering energy from stack gas rich in carbon monoxide and water vapor. The waste gases would be reacted catalytically at the electrode surface to yield hydrogen for cell operation and CO₂. Since the latter would carbonate the caustic solution, regeneration of the electrolyte would be required.

Future Uses: If the fuel cell is to compete with conventional power systems as they are known today, says National Carbon, an inexpensive source of hydrogen is a must. But the picture could change considerably if ways can be found to team fuel cells with other devices for harnessing unused energy from other sources.

In Britain, for example, the nationalized railway industry has considered the use of fuel cells to level out peaks and valleys in daily power demands (CW, May 28, '55, p. 50). Idle generating capacity would be utilized during slack periods to dissociate water into hydrogen and oxygen; fuel cells would then convert the stored energy back into electricity during periods of peak demand.

Fuel cells may also hold the key to the utilization of hard-to-harness solar energy, suggests National Carbon, by using solar energy to decompose water during sunny periods, storing it as chemical energy.

But regardless of how the fuel gases are produced, the new fuel cell stands ready to turn them into needed electrical power for industrial use.

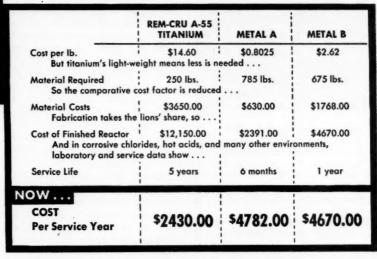
Engineering Calculator

To free its scientists and engineers for more constructive work. The Fluor Corp. (Los Angeles) has acquired a Datatron stored-memory electronic digital computer to handle routine and time-consuming calculations. \$250,000 machine will be installed at the company's new computer center in Whittier, Calif., will be operated by research division personnel. Primary application of the Datatron will be in engineering calculations required for the process and mechnical design of chemical, petroleum, petrochemical power plants. Typical problems it will handle include design of distillation columns, piping systems, pressure vessels and rigid-frame structural design. The computer solves in minutes design problems that formerly required as much as a month of manual calculation.

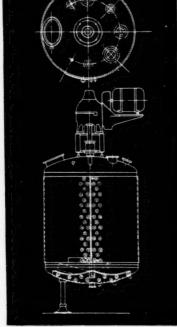
can you afford not to use TITANIUM?

By themselves, catalog prices of raw materials can be misleading. For it's the final cost-in terms of service life-that really determines what you pay for equipment.

The following table, based on cost analysis by the Pfaudler Company, indicates their estimate of comparative costs of producing the reactor unit shown at the left, using titanium, and two other well-known, corrosion-resistant metals.



Don't be fooled by raw material costs alone-it's the cost per service year that really counts. Then, too, down-time losses while equipment is being replaced can quickly mount up. Another plus for longer-lasting titanium. Why not let a REM-CRU engineer help you make the best, most profitable use of titanium?





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Nuclear Signposts Go Up

To chemical producers and equipment manufacturers eager to enter the potentially lucrative field of nuclear power generation, the longrange uncertainty (e.g., the question of which type of nuclear reactor will be most economical) has been a disquieting element of risk. Though there's no denying that nuclear systems are slated for a major role in future power generation, it's still too early to chart the route they'll follow. Nevertheless, some signposts indicating the likeliest routes to many of the short-range goals have been posted in recent reports by AEC and Britain's Atomic Energy Authority.

Raw Materials: One point on which AEC and AEA agree is the prospect of sustained demand for and continued expansion of uranium feed materials production. Both agencies are pushing the development of uranium-fueled reactor systems. As a result, look for uranium to dominate the field—surely through the 1960s, probably through the '70s.

AEA's estimates, based on recently declassified data, place the total Western-nation production rate at about 13,000 tons/year of U_3O_8 at the end of '56. It predicts that it will grow to 40,000 tons/year by '59. U.S. producers continue to lead in the West's production, will have an estimated output rate of 10,800 tons a year by the end of this year, 14,000 tons/year by the end of '58.

Thorium still looms as a potentially important nuclear fuel for thermal reactors employing the thorium-U²³³ cycle (CW, April 27, p. 94). But AEA reports that a consistent demand for thorium is still a number of years away.

Process Development: Most significant processing technique to evolve in the past year or so is solvent extraction. AEA replaced batch ether extraction with solvent extraction for purification both of feed concentrates and of works residues in mid-'56. The plant operated according to flow-sheet calculations with virtually no startup problems, reports AEA, and has led to "useful reductions in costs."

In the U.S., too, solvent extraction is proving to be a useful tool for winning uranium from hard-to-process ores. AEC has explored the technique

extensively at its Grand Junction, Colo., pilot plant, has found it an attractive alternative to ion exchange for recovery of acid-leached Westerngrade ores. As a result of studies conducted by the Bureau of Mines (Salt Lake City), Winchester Laboratory (Winchester, Mass.) and at Grand Junction, three privately owned ore processing mills have adopted solvent extraction as more efficient than previous methods.

A major nuclear processing problem still to be solved is the task of reprocessing spent-fuel elements. The complexity-and, therefore, the cost -of a facility capable of handling all types of fuel elements appears to be the chief deterrent to privately financed participation in this activity. The relatively small demand for reprocessing services at the present time makes such an operation unattractive from the standpoint of short-range return. However, the startup of commercial reactors now on the drawing boards or under construction should boost reprocessing requirements substantially in the not-too-distant future.

In the absence of commercial plans for spent-fuel recovery facilities, AEC has assured private reactor operators that the government will provide reprocessing services if they are not otherwise available when needed.

Methods that will minimize the cost of reprocessing are very much in demand. AEA's latest approach: a hightemperature process in which spent fuel is melted, waste fission products are removed as slags.

AEC, meanwhile, is studying several reprocessing systems: Oak Ridge National Laboratory and Phillips Petroleum are working on the Darex system of dissolving stainless steelbearing fuels in mixed nitric-hydrochloric acids; ORNL is also developing the Zircex process, which involves anhydrous hydrochlorination of zirconium-bearing fuels to permit the recovery of zirconium as a volatile product. In both of these processes, uranium may be recovered by converting it into aqueous uranyl nitrate and separating it from fission products by liquid-liquid extraction.

Argonne National Laboratory is tackling high-temperature reprocessing, did the preliminary work on a

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ENGINEERING

volatility process soon to be piloted at ORNL. Argonne has also laid the groundwork for a method by which the fuel is dissolved in molten zinc, uranium is separated as an intermetallic uranium-zinc compound. A third ANL-developed process for the recovery of fissionable material from irradiated zirconium-uranium fuel is already in operation at the Idaho Chemical Processing Plant.

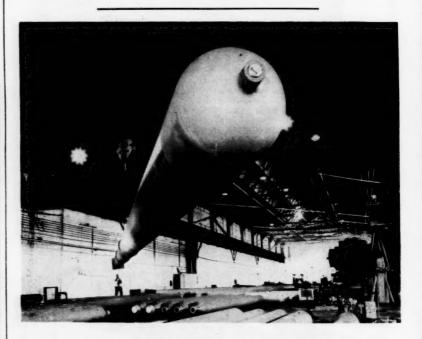
Reactors Hold the Key: Forecasting nuclear processing and equipment requirements would be simpler if it were possible to predict the type of reactor most likely to achieve economic production of competitive electrical power. But technology in this area is developing so rapidly that today's brightest reactor prospect may be completely eclipsed by tomorrow's technological breakthrough.

The British, for example, have elected to stick with the gas-cooled,

graphite-moderated reactor, expect that it will be the mainstay of their nuclear power program for many years to come. This doesn't mean, however, that technological development on this type of plant is slowing down. On the contrary, it has enabled AEA to intensify and concentrate its efforts on the problems peculiar to the gas-cooled reactor system.

A significant development now being studied in England—and one that could influence future fuel element technology in the U.S.—is the switch to high-temperature fuel components. AEA is shooting for the 400-600 C operating range, believes that the resulting increase in efficiency would boost the capacity of a two-reactor station from its present level of 300 megawatts to 800 mw.

Such a change would mean extensive modification of existing fabricating techniques, or development of



Oxygen Cylinders Go King-Size

Like the booming demand for tonnage oxygen (CW, June 15, p. 92), pressurized storage cylinders for industrial gases are growing to record size.

The king-size containers (above), produced at the Christy Park Works of U.S. Steel's National Tube Division (McKeesport, Pa.), measure 80 ft.

from end to end. Thirty of these cylinders, installed vertically to conserve floor space, will provide high-pressure storage of oxygen needed for steelmaking at the Granite City Steel Co. (Granite City, Ill.). Oxygen will be supplied from a 73½-tons per day air separation unit by Air Products, Inc.



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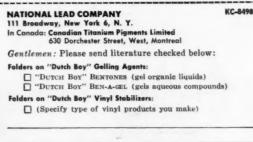
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Excerpts From The Chemical Hall of FAME



Paul Sabatier

In 1915 Sabatier was awarded the Nobel prize for the numerous hydrogenation experiments which he carried out. Originally interested in physical chemistry, he later had such famous students as Senderens, Mailhe, and Murat.

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ENGINEERING

completely new ones. Difficulties with bowing of fuel elements indicate that present units are currently being operated near the upper temperature limit. Alternative solutions: a switch from metallic elements to uranium-oxide ceramic fuel, or substitution of a higher-temperature material (e.g., beryllium) for the present canning material.

Multiple Choice: Because the economic incentive for rapid development of commercial nuclear power is less in the U.S. than in England, AEC hasn't settled on one type of reactor system. And though water-moderated systems such as the Shippingport pressurized-water reactor and ANL's boiling-water reactor hold the edge, six other types are being checked.

Among those presenting some of the most challenging problems in process engineering and equipment design are the aqueous homogeneous, the liquid metal-fueled, and the molten plutonium types. All three require integrated chemical processing facilities for the continuous removal of waste fission products from liquid fuel. But even more vital to the continued progress of liquid-fueled systems is the development of suitable materials of construction to contain the extremely corrosive fuels.

Promising Prospect: One relatively new material of construction highlighted in AEC's report is columbium (niobium). Its outstanding characteristics-low neutron-absorption cross section, excellent strength and ductility at high temperatures—have made it the subject of extensive research and development.

Three-fold goal of current studies: improvement of columbium's hightemperature characteristics (e.g., by alloying with other metals) to minimize its tendency to oxidize readily in air; control or prevention of interstitial impurities, such as oxygen, hydrogen, nitrogen and carbon, that lead to embrittlement; reduction of high production costs (currently \$150-100/lb.). Greatest progress toward the latter goal has been made by two new extractive processes: (1) a reduction to the metal from the oxide; (2) a fusedsalt electrolysis.

As the road to future nuclear goals becomes more clear, chemical process and equipment firms will find increasing opportunity for profitable private participation.

This man washes eight times a day

(He's part of a quality control team that protects Dow caustic)

This man washes the insides of tank cars at the rate of about one an hour. Half an hour of intensive spray-washing, then half an hour of forced air drying.

These are very special tank cars because they're lined and insulated to handle shipments of Dow caustic soda solution. And every one of them gets a thorough cleaning each time it returns to one of the shipping points that make up the nation-wide Dow distribution network.

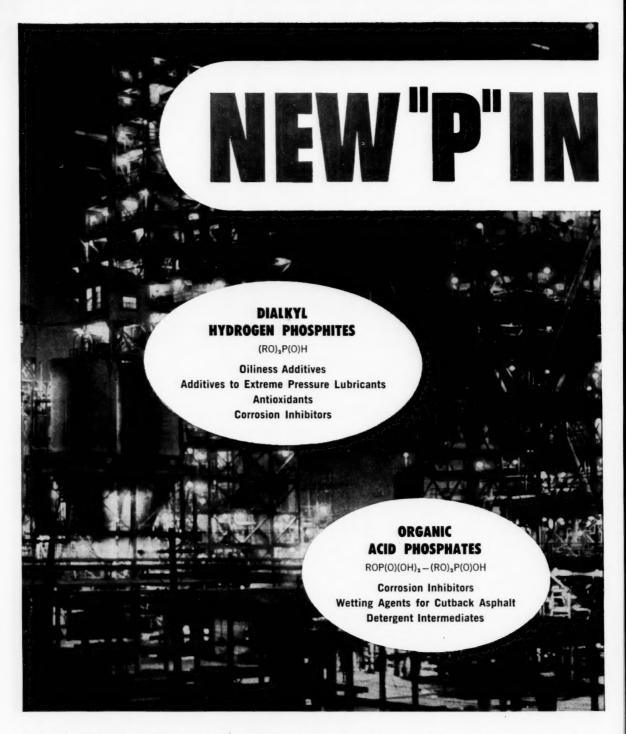
This practice helps guard Dow caustic against contamination. It's part of a well coordinated system of quality control operations at Dow that maintain rigid standards of product quality.

To learn how this system benefits all Dow caustic customers, contact your nearby Dow sales office or write to us. The DOW CHEMICAL COMPANY, Midland, Michigan, Dept. AL603C-1.

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NEW YORK



Market Newsletter

CHEMICAL WEEK
September 21, 1957

What's the polyethylene outlook? If all the capacity planned to be in production by 1960 is utilized, the U.S. will be able to produce resin at a 1-billion-lbs./year rate—and 30% of the total will be of the newer high-density material. That's the picture lined out at the week-long ACS meeting in New York (see also p. 43) by Aries Associates' Robert Aries and David Dworkin.

Actual production three years hence, however, they indicated, will probably be about 760 million lbs., with 18% of the total being high-density. U.S. production is expected to climb to some 1.1 billion lbs. by '62, with high-density polyethylene accounting for approximately 39%.

And how will the two types fare in garnering markets? Here's the Aries' rundown of a probable '62 end-use pattern giving the estimated share (in million pounds) for the older and the new type of polyethylene:

End-Use	High	Low
Molded articles	120	100
Electrical	45	75
Film	100	250
Pipe	30	110
Paper coating	35	55
Bottles, tubes	25	75
Fibers	25	
Miscellaneous, exports	60	40

Chief problem facing the industry, Aries pointed out, is how to sell the output of present—and upcoming—polyethylene facilities. By '58, there may be at least eight commercial producers of low-pressure polyethylenes, in addition to nine current makers of high-pressure material. At least seven other companies are reportedly doing development work aiming toward low-pressure poly production.

A hotter scramble for epoxy resin markets is in the making. Reichhold Chemicals is quietly completing expansion of epoxy producing facilities—to be onstream soon—at Azusa, Calif.; Elizabeth, N.J.; Detroit, Mich.; Tucaloosa, Ala.

The company, already a strong force in synthetic resins (polyesters, alkyds, phenolics), has stepped out fast in the epoxies field. It signed up for a Devoe & Raynolds license in Oct. '56, and by the first of the year was producing commercial quantities at its South San Francisco plant. In May, a unit at Ballardvale, Mass., began operations.

To the trade, the Reichhold moves spell stiffening competition.

"A major step toward development of a plastic hot water pipe"—long a target for researchers—is how U.S. Rubber describes its newest

Market Newsletter

(Continued)

styrene-butadiene-acrylonitrile resin (Kralastic HTHT). The high-temperature, high-tensile material was revealed this week at dedication of the company's new Research Center in Wayne, N.J.

Lack of heat resistance has been the major obstacle to any allout plastics assault on the lush hot water pipe market now held firmly by metals, and, though U.S. Rubber's claims are cautious, the new resin appears to be a significant breakthrough. The material is in production at the firm's expanding (CW, July 20, p. 88) Baton Rouge, La., plant.

The posting of higher fourth-quarter schedules continues as a feature in the nation's chemical market places. Among the latest items slated for contract increases: p-dichlorobenzene, cellulose acetate, sodium acetate, bis-phenol-A, solid and liquid forms of caustic potash.

Monsanto last week upped its p-dichlorobenzene prices $2\frac{1}{2} \notin$ a lb., setting the tag at $14\frac{1}{2} \notin$ /lb. for c.l. quantities and $17 \notin$ /lb. for 2,000 lbs. or more. It's a reversal of the cuts initiated late last year (CW Market Newsletter, Dec. 15) when the para market was buffeted by rather sharp competitive conditions and depressed demand.

Custom smelter copper prices are higher— $26 \frac{e}{l}$ lb.—following late last week's surprise pull-up in the metal's long downward skid. The new price represents a full $1 \frac{e}{l}$ lb. hike over the $25 \frac{e}{l}$ level set the previous week when prices were chopped $1 \frac{1}{2} \frac{e}{l}$ lb.

Although the smelters' action is putting some starch into the rather shakily maintained primary producers' price (27ϕ) , some traders are inclined to regard the sudden copper pickup as something transitory. Why? The industry's statistical position is still way off balance.

Eastman Chemical is producing neopentyl glycol from a just-completed (five months behind schedule) full-scale plant at Longview, Tex. (CW Market Newsletter, Feb. 29). First truckload quantities were shipped last week to a large Southeastern polyester producer. The firm will primarily court such users to buy up the plant's "several millions pounds/year" potential output. One potent sales pitch: a new 37 e/lb. price tag, an 8e/lb drop from the previous price in effect since '55.

SELECTED PRICE CHANGES-Week Ending September 16, 1957

DOWN		
	Change	New Price
Copper hydrate, drms., c.l., frt. alld., E of Mississippi	\$0.0075	\$ 0.4825
Copper oxide, black, bbls., 100-1,999 lb. lots, wks	0.01	0.4425
Mercury metal, 76-lb. flask	4.50	243.50
Zinc hydrosulfite, drms., c.l., frt. alld	0.005	0.215

All prices per pound unless quantity is stated.

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Designed and constructed by Foster Wheeler for the American Gilsonite Company* at Gilsonite, Colorado, this combination delayed coking and thermal cracking unit is converting 700 tons per day of Gilsonite into 50 per cent Coke (350 tons per day), 15 per cent Gas and 35 per cent Gasoline. This installation marks the first commercially successful conversion of a solid asphaltic-type ore into salable products.

*Affiliate of Barber Oil Corporation and Standard Oil Company of California

FOSTER WHEELER

East Germany's Five-Year Plan

(th	ousand	tons)

		(thousand tons)		
	Produced 1955	Planned 1960	Increase	
Sulfuric acid (as SO ₃)	483	725	50%	
Caustic soda	257	350	37	
Soda ash	459	730	59	
Calcium carbide	813	1,000	23	
Nitrogen fertilizers (available N)	293	335	14	
Phosphatic fertilizers (available P2O5)	85	200	150	
Potash products (available K2O)	1,552	2,200	40	
Synthetic rubber	70	100	41	
Cellulosic fibers	106	118	11	
Noncellulosic fibers	3.5	15.6	350	

East German Chemicals Set for Surge

East Germany's chemical industry has, so far, been eclipsed by the burgeoning chemical expansion in West Germany. And such progress that has been made is hidden behind the inevitable veil of Communist secrecy. But if East Germany's current five year plan reaches its goals, the "German Democratic Republic" may soon be ready to stake out a sizable claim in the world chemical export market, move into greater prominence on the international chemical scene.

Under the plan, the East German government has set aside close to DM 5 billion (\$1.2 billion) for chemical expansion projects scheduled to be completed between 1955 and '60. This represents about 20%' of the gross amount allotted for total industrial expansion in that country.

Planned production goals for most chemicals are well beyond potential domestic needs—and that presages exports. The news is not cheering to other European nations, already hard pressed to expand outlets for their own chemical products.

Heavy Chemicals Head Up: A 50% over-all increase in the output of basic chemicals during the 1955-60 period is anticipated. The sulfuric acid production goal—an important barometer of general industrial activity—for '60 is also 50% higher than it was for '55: some 725,000 tons, compared with 483,000 tons (as SO₃) in '55.

And a serious effort is being made to reach this goal; last year, a 140,-000-tons/year anhydrite plant went onstream at Wolfen, and a new 180,-000-tons/year anhydrite sulfuric acid plant now nears completion at Coswig.

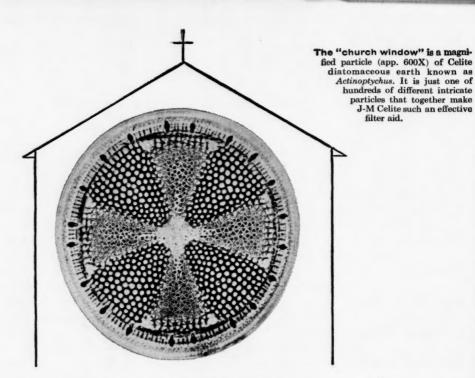
Help is potentially available in the form of elemental sulfur from Poland. Sulfur deposits—estimated, by some,

to be 50 million tons—have recently been found in Poland. If capacity can be installed, Poland should be able to produce about 200,000 tons of sulfur annually, more than enough for domestic needs. But Poland is severely hampered by both economic and technological difficulties; it appears doubtful that it could supply Germany with sulfur in the near future.

Output of soda ash in East Germany will likely increase at a fast clip under the five-year plan. The '60 soda ash production target is about 730,000 tons/year—59% more than the 459,000 tons produced in '55.

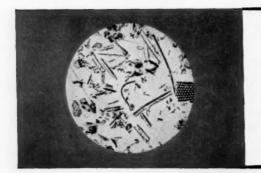
Caustic soda production is also slated to show a healthy, though relatively small, increase between '55 and '60. Some 257,000 tons were turned out in '55; 350,000 tons/year by '60 is forecast.

Calcium carbide production is ex-



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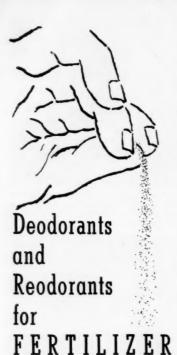
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MARKETS

pected to hit 1 million tons/year by '60, an impressive 53% surge over the 813,000-tons mark set in '55. New carbide units are being hurriedly installed, and existing installations at Schkopau and Piesteritz are being modernized and enlarged.

The dependence of East Germany's organic chemical production on coalderived calcium carbide is one major source of concern to that country's chemical leaders. They urge expansion of petrochemical production. As a start, a petroleum cracking unit and an aromatic-chemicals plant have been installed at Leuna.

Fertilizers Forge Ahead: Output of agricultural chemicals, especially fertilizers, rate high on the five-year program. Gross output of nitrogen products may hit 450,000 tons (of available nitrogen) by '60—of which some 335,000 tons will go into fertilizers. This compares with a total '55 nitrogen output of about 370,000 tons, of which some 293,000 tons were consumed by agriculture.

Phosphate fertilizer output is also slated for a hefty gain. The production forecast for '60 (200,000 tons of available P₂O₅) will represent a whacking 150% hike over the 85,000 tons made in '55. If realized, this

staggering increase in phosphate output will materially strengthen East Germany's bid for a place among top exporters of chemical products.

Production of potash for both agricultural and industrial needs is also being geared up. The potash industry required a huge labor force and high government subsidies to produce some 1.6 million tons of available K₂O in '55. Target for '60 is about 2.2 million tons (some 40% more than in '55) and is to be achieved with only half the present labor force. Potash industry expansion is keyed to a 10-year—rather than a five-year—plan.

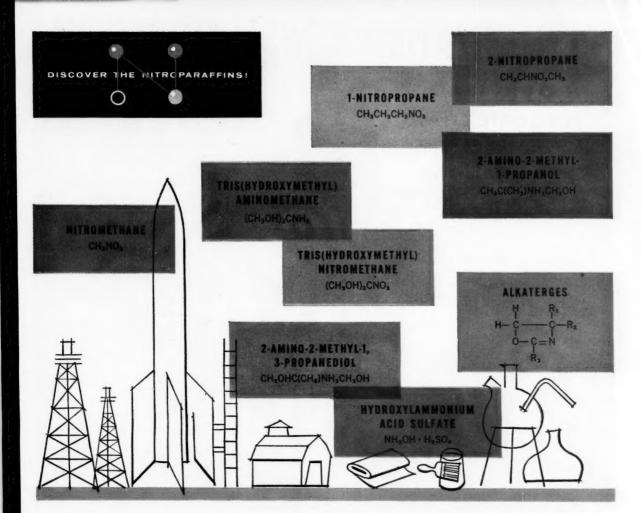
Surge in Synthetic Fibers: Synthetic fiber production will also gain momentum under the five-year plan. The target for cellulosic fiber output in '60 has been set at 118,000 tons, about 11% more than the 106,000 tons made in '55. Production of fully synthetic fibers, on the other hand, is expected to soar more than fourfold—to 15,600 tons in '60, from 3,500 tons in '55.

Production at East Germany's only caprolactam plant is aimed, though not too confidently, at 12,000 tons for '60 (about 115% more than in '55). Perlon, a polyamide fiber developed in Germany is slated for 84% growth,

East Germany Plastics Output

(thousand tons)

(thou	isand tons)		
	1951	1955	1956
Polyvinyl chloride	29.6	42.0	46.0
Other vinyl resins	.2	1.6	3.0
Polystyrene	.7	2.0	2.6
Amino resins	5.2	10.0	8.7
Phenolic resins	6.8	19.6	22.1
Polyamides	_	.1	.1
Lacquer resins	_	6.2	7.6
Acrylic resins	_	.1	.2
Others	8.7	12.1	13.0
Total	51.2	93.7	103.3



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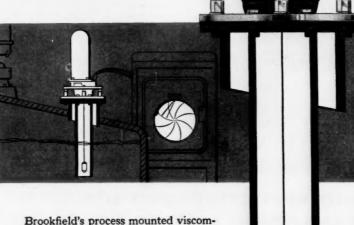
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MARKETS

during the same period. Output of acrylonitrile (no figures are available) should also show a substantial gain.

Plastics Step-up: Despite a substantial growth of East Germany's synthetic resins and plastics production (see table, p. 140), the country still lags behind West Germany in this area-103,000 tons vs. 505,000 tons produced in '56.

The five-year program should not only spark increased output of established plastic materials but also will likely bring new ones to the scene. Output of polyvinyl chloride is slated to hit 72,000 tons by '60, some 72% more than was produced in '55. New resins (for East Germany) to be made during this period include polyethylene, polyurethanes, silicones and fluorinated hydrocarbons.

Production of epoxy resins began in '56, and the plant reportedly operated around-the-clock to keep up with domestic needs. High priority is being given to the development of highly fluid epoxy resins for use in relining pipes and the repair of machines.

A cellophane plant is already in full-scale production, and another is under construction.

Production of rubber tires is expected to double between '55 and '60 -an estimated 3 million units will be made in '60. Production of buna rubber will reach 100,000 tons in '60, a gain of more than 40% over the '55 output. Motor fuel production will likely climb to an impressive 2.3 million tons—a 45% growth in five years.

Energy and Raw Materials: To meet these ambitious goals by '60, East Germany must, of course, increase its available power supply.* Consequently, the country's lignite -fuel and basic chemical raw material-plays an important role in the five-year program.

Production of lignite by '60 is expected to total about 260 million tons/year or about 30% more than the 200 million tons produced in '55and, in fact, more than was ever mined in Germany. New mines are now being opened in eastern Lausitz and modern equipment is being installed to speed production.

Incidentally, it's in the Lausitz area

*East Germany's electrical energy output will be hiked to 44 million kilowatt hours by '60—about 53% more than the 29 million kwh. produced in '55. The '55 output was somewhat less than the target previously set for that year, but it's hoped that power achievements by '60 will offset this minor setback.

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MARKETS

that the largest individual project sponsored by the five-year program-a coal-processing venture—is being built; the final stage of the Schwarze Pumpe combine is scheduled to go onstream in '63. It will be able to process about 32 million tons of coal annually, to yield, among other products (e.g., gas and coke), some 500,000 tons of tars, oils and other chemical raw materials.

The general feeling in the W.S. that East Germany is far behind the times as a chemical producer is not wholly supported by the recently revealed '55 production figures. If the ambitious five-year plan is reasonably successful, East Germany's chemical industry could soon emerge as a major exporter. That, however, is a big it.

Synthetic Fiber Lure

The latest broadside in Puerto Rico's campaign to attract chemical and related industries is aimed at potential synthetic fiber producers. It's a 100-page survey detailing the cost savings the island offers to manufacturers of acrylic, polester and polyamide fibers.

Titled "The Production of Synthetic Fibers in Puerto Rico", the study analyzes labor, transportation, utilities, taxes, etc., consudes that cost savings of ½ ¢/lb. for staple fiber and 7-9¢/lb. for continuous filament can be achieved.

Even without Puerto Rican tax exemption, the report points out, a fiber manufacturer producing 36.5 million lbs./year would save one-third to twothirds of a million dollars for staple, and \$2.5-3 million for continuous filament.

Further, says economic consultant Thomas Vietoris, who prepared the survey for the P. R. Economic Development Administration, during the 10-year tax-exempt period, "profits of a synthetic-fiber plant in P. R. may be three times as much as after-tax profits at competing U.S. locations."

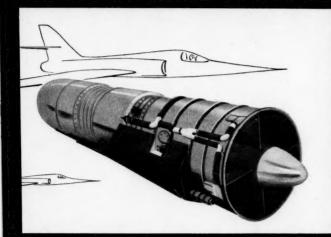
The new survey tends to confirm findings of a previous Massachusetts Institute of Technology report. Both are given added meaning by the continued fast growth of Puerto Rico's textile industry.

Several U.S. synthetic fiber manufacturers, according to EDA's Office of Economic Research in San Juan, are investigating sites for specific projects.

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Misch Metal in alloys

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Misch metal, an alloy of rare earth metals, provides magnesium casting alloys with qualities particularly applicable to jet engine parts. Misch metal decreases the porosity of the alloy, giving it pressure tightness, and increases its high-temperature creep resistance the ability to withstand long periods of stress at high temperatures without distortion. The addition of misch metal to certain stainless steels improves their fabricating properties. Freedom from oxide coating is unique with Mallinckrodt misch metal. Technical information is available on request.

Gallotannins for many uses

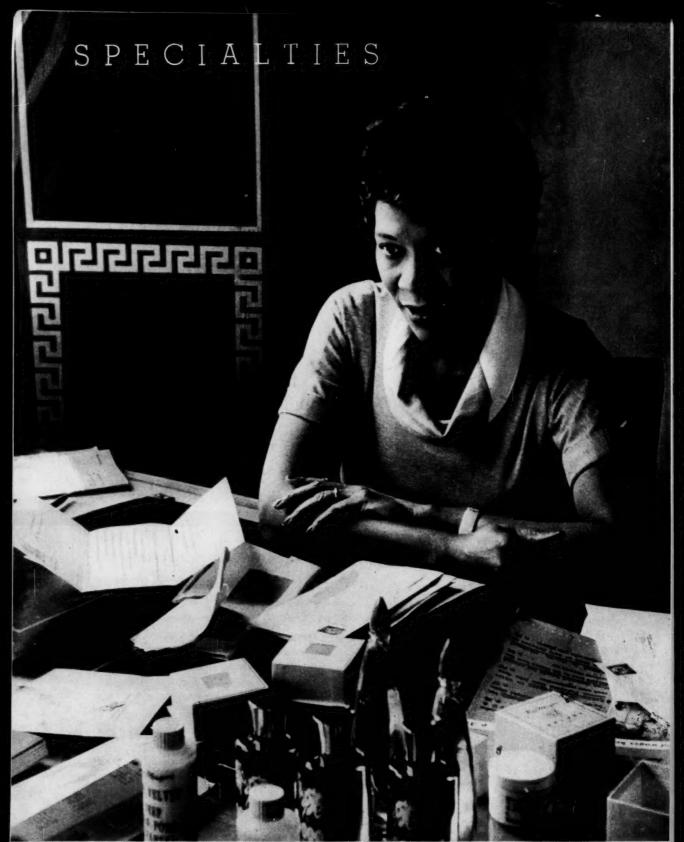
Tannic Acid is used in printing inks where it improves bleed-resistance, aids in pigment suspension, adds gloss and provides permanence. It serves as a coagulant and stabilizer in wine and other beverages. It is also used to coagulate aqueous suspensions of asbestos. Gallic and pyrogallic acids are used in dressing and dyeing furs. The rubber industry has found pyrogallol helpful in vulcanizing synthetic rubber, inhibiting hardening and softening, and as a stopping agent in the copolymerization of GR-S rubber.

Your particular application of these and other Mallinckrodt industrial chemicals may be different. Drop us a note on your requirements you might be better served by Mallinckrodt.



MALLINCKRODT CHEMICAL WORKS

SECOND & MALLINCKRODT STREETS, ST. LOUIS 7, MO. • 72 GOLD STREET, NEW YORK 8, N. Y. CHICAGO . CINCINNATI . CLEVELAND . DETROIT . LOS ANGELES . PHILADELPHIA . SAN FRANCISCO IN CANADA: MALLINCKRODT CHEMICAL WORKS LIMITED . MONTREAL . TORONTO



PHOTOS BY DICK SAT

Owner of two of the world's busiest beauty salons and head of \$1-million/year manufacturing business, enterprising Rose Morgan proves there's money in the Negro cosmetic market.



Lessons for beauty operators are weekly features at both Rose Morgan salons. Miss Morgan, shown demonstrating skin-cream application, personally conducts sessions, is an accomplished operator.



During rush periods at main salon in New York's Harlem, as many as 90 operators are kept busy. Hair straightening and curling account for 90% of the business. Permanents start at \$12.50

Beauty Begets a Million-Dollar Business

Rose Morgan, manager of two of the world's busiest beauty salons, finds the Negro cosmetic market both lucrative and grossly underestimated (see p. 152) by the industry at large.

Miss Morgan's venture into this field has paid off handsomely. Rose-Meta Cosmetics, launched in 1948, now brings in more than \$1 million a year. A companion line—Rose Morgan Cosmetics, added in 1955—now sells

at a \$250,000/year pace. "Because Rose Morgan was a living symbol, I found that the new line caught on faster than Rose-Meta," she says.

Today Rose-Meta Cosmetics features 75 different products—ranging from hair brushes to foot cream. And the Rose Morgan line is growing fast, too. "My Man" cologne and an improved hair straightener are the newest additions (17th and 18th) to

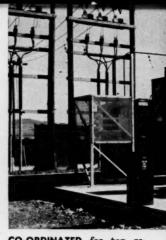
the latter. Miss Morgan has not forgotten the man in her cosmetic marketing. She sells 10 men' cosmetics.

Contract manufacturer B. H. Krueger (New York) makes the Morgan line; Fuller Products (Chicago), Rose-Meta.

Hair straightening accounts for the largest proportion of her beauty shop business. Working with her own chemists, she is now attempting to perfect



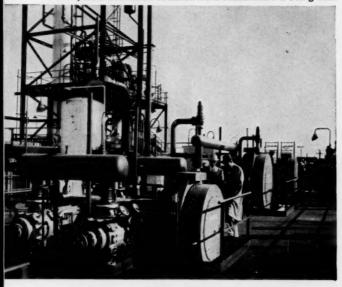
BUILT IN 14 MONTHS by The M. W. Kellogg Co., new ammonia plant is a unit of Standard's Richmond refinery, one of West's largest. All electric equipment is by General Electric, which also provided engineering service to help achieve fast start-up.



CO-ORDINATED for top reliability, G-E equipment in master substation for ammonia

At Standard's Richmond, Calif., refinery... General Electric engineering services help

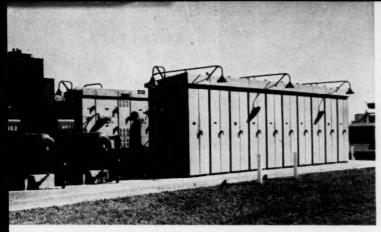
OUTDOOR-LOCATED on platform to drive compressors are 8 highefficiency, enclosed, force-ventilated G-E synchronous motors (3 shown) with excitation obtained from substation's d-c m-g sets. PLANT'S BIGGEST, a 4000-hp 12,000-v totally enclosed forceventilated G-E induction motor drives synthesis gas compressor. Explosion-proof 60-hp G-E motor (r.) drives blower



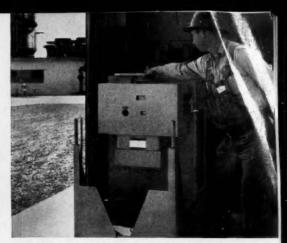
WEATHER-PROTECTED, 2 rugged 350-hp G-E induction motors drive cooling-water pumps. Other plant induction motors are either enclosed force-ventilated or explosion-proof, fan-cooled.







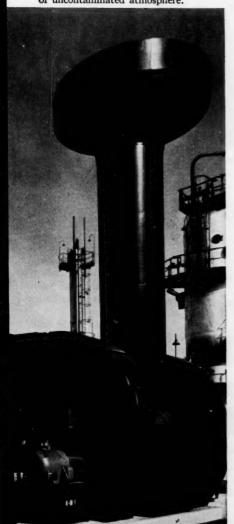
plant includes 5000-kva transformer, 17 units of 12-kv metal-clad switchgear, 2300-v Limitamp* motor starters, 480-v outdoor motor control centers, 2 outdoor motor-generator sets, and two 480-v transformers. *Registered trade-mark of General Electric Co.



EASY MAINTENANCE of plant's G-E metal-clad switchgear is shown by workman removing vertical-lift, magne-blast circuit breaker for inspection.

speed opening of 300-ton/day ammonia plant

drawing clean air—via black ductwork and mushroom tower—from upper level of uncontaminated atmosphere.



General Electric power system, installed to meet rigid construction schedule, helps plant get fast start on profitable production

Standard Oil Company of California, Western Operations, Inc., recently added to its Richmond, California refinery—the largest west of the Rockies—a new \$11 million ammonia plant designed, engineered and built by The M. W. Kellogg Co. The plant's capacity of approximately 300 tons per day of anhydrous and aqueous ammonia is shipped to nearby California Spray Chemical Corp., a subsidiary, for conversion into fertilizer.

GENERAL ELECTRIC supplied the new plant's electric equipment—compressor drives, auxiliary motors, and complete outdoor substation with co-ordinated components. In addition, General Electric engineering services helped both customer and designer get the new plant from the discussion stage to on-stream in only 14 months.

An example was the contribution of General Electric installation and field service engineers. By supervising the installation of the electric equipment as scheduled deliveries arrived, they helped reduce field installation costs, speed completion of construction schedules, and hasten start-up time. To Standard, this meant getting into production faster, and thereby, showing a return sooner on the large capital investment tied up in the plant.

IN ADDITION, the 17,000-kva block of power will be integrated into the existing plant system. General Electric application engineering services, working closely with Standard and Kellogg representatives, helped provide the electrical equipment co-ordination and integration necessary to meet the plant's process power requirements.

For your new chemical plant, too, General Electric offers a one-manufacturer source of quality electric equipment and valuable engineering services to help provide you and your process contractor with an efficient, co-ordinated electrical system. Early in your planning, contact your nearest General Electric Apparatus Sales Office. General Electric Company, Schenectady 5, N. Y.

Engineered Electrical Systems for the Process Industries



SPECIALTIES

ists, she is now attempting to perfect a hair straightener that will have a longer-lasting effect. Many of the hair straighteners used today, she says, "not only burn hair but also don't last."

Miss Morgan seeks an improved hair straightener not only for her women customers, but for men too. Just a few months ago, she opened a department catering exclusively to men. The new department, which has five special operators and handles an estimated 100 customers weekly, is the most recent of her ventures.

Women, of course, comprise a far greater portion of her clientele. In her two shops—the most recent of which was opened in '55—some 3,000 women are given weekly beauty care. Aside from hair straightening, most popular treatments are facials, manicures, shampoos and hair styling.

Contrary to a popular misconception, skin bleaching is not a major concern of Negro women, Miss Morgan says. "Most Negro women are not interested in bleaching their skin. They are more concerned with obtaining an even, smooth complexion," she says.

Rose Morgan's two shops have no slack seasons. About 80% of summer customers are tourists. A total of 170 operators are employed to handle this trade. The beauty shop business alone brings in about \$275,000/year, exclusive of revenue from Morgan cosmetics sold in the shops.

Fast Capital: Both cosmetic lines are sold only through Miss Morgan's two Harlem beauty salons and by house-to-house calls. Five hundred salesmen cover the New York area. "House-to-house selling insures fast working capital," Miss Morgan claims.

Advertising is now limited to Ebony, Jet, and a few local Negro newspapers. One recent ad in Ebony brought in 3,000 mail orders.

But selling isn't hard, she confesses. In their search for a superior product, Negro women often spend more than they should, she declares. And she says, "The average Negro woman spends a greater portion of her income for cosmetics than the average white woman does."

Backing these contentions are her handsomely appointed (and usually crowded) beauty salons, the highly profitable sales of her cosmetics.



Approving ad for one of 75 Rose-Meta products is important detail in cosmetic maker's busy agenda. Powder, lipstick sell best.





Conferring with firm's chemist, she checks progress in development of new hair straightener that will have long-lasting effect.

Now! ISOPHTHALIC based paints and plastics are leading the way to **Industrial Finishes** superior products

Important new raw material of many uses

With Isophthalic now in plentiful supply from Oronite Chemical Company's 50 million pound per year capacity plant, paint manufacturers can produce new and better surface coatings that have superior flexibility, hardness, impact resistance, color and gloss retention. Plastics (Polyamides, Polyesters-amides, Polyesters) employing Isophthalic based resins open the door to new and better products at attractive cost.

Paint

With Isophthalic, longer oil length resins (up to 93%) can be built that dry faster to tougher films, and the longer oil length results in significant cost savings.

Baking Finishes

Isophthalic baking finishes are harder, have better gloss retention, are more resistant to alkali, water and mineral spirits. Less amino resin is required resulting in further cost savings.

Exterior House Paints

Formulation of Isophthalic alkyd oils with pentaerythritol and low rosin content tall oil fatty acids produces house paints with superior drying properties than those made from soybean oil. The harder drying films of Isophthalic paints have better resistance to mold growth, film checking and cracking than conventional linseed oil paints. Exterior house paints made with Isophthalic have superior weathering characteristics, excellent non-yellowing

Interior Gloss Enamels and Flats

Odorless enamels and flats of excellent quality can be produced more economically with Isophthalic resins. Low rosin content tall oil acids used in longer (70-75%) oil length Isophthalic resins provides a low cost vehicle for interior enamels that are unusually flexible, have excellent gloss retention properties.

Industrial finishes that dry faster, adhere better to metal and that retain their gloss longer are now possible with Oronite* Isophthalic. Such coatings are especially suitable as exterior structural steel paints, equipment finishes, enamel undercoatings and industrial primers.

Plastics

The superior properties of polyesters made with Isophthalic are maintained even at high styrene dilutions. With Isophthalic high viscosities can be adjusted by further dilution with styrene without loss in properties. The excellent performance of Isophthalic at greater styrene dilutions offers new economies in the cost of materials for resin solutions.

Plasticizers made with Isophthalic have greater thermal and color stability, higher boiling points, better resistance to oxidation, greater plasticizing efficiency and less toxicity and no odor.

Reinforced plastics, of unsaturated polyester type that withstand higher temperatures, that can resist more flexing, that have higher impact strength and that have better adhesion to glass are now possible with Oronite Isophthalic. When Isophthalic based plastics are reinforced with glass, these properties carry over into the laminates resulting in superior resistance to water erosion and pressure.

Let Oronite prove to you how Isophthalic can benefit

your products. Oronite field representatives will be glad to

demonstrate to you the many advantages of Isophthalic



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ORONITE CHEMICAL COMPANY

EXECUTIVE OFFICES • 200 Bush Street, San Francisco 20, California SALES OFFICES · New York, Wilmington, Chicago, Cincinnati, Houston, Los Angeles, San Francisco EUROPEAN OFFICE • 36, Avenue William-Favre, Geneva, Switzerland

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Unrestricted quantities delivered within 24 hours to points in Middle Atlantic and New England areas. Write, wire or phone your requirements for Formaldehyde 37% and 45% Low Methanol (Uninhibited), and Inhibited; Hexamine Technical, Powder or Granular.



MERCK & CO., INC. CHEMICAL DIVISION RAHWAY, NEW JERSEY



Men on the Move

Now available in a new edition . . . with new figures.

This popular booklet points up the important sales problem of personnel turnover in industry. Out of every 1,000 key men (over a 12-month period) 343 new faces appear . . . 65 change titles . . . 157 shift . . . and 435 stay put. These figures are based on average mailing address changes on a list of over a million paid subscribers to McGraw-Hill magazines.

Write us for a free copy

Company Promotion Department McGraw-Hill Publishing Co., Inc. 330 West 42nd Street, New York 36, New York



This cosmetics customer wants, insists on quality."

Selling the Negro Market

When the October issue of Ebony magazine hits newsstands next week, it will carry a full page advertisement for Helene Curtis's Enden shampoo. The use of Negro models in an ad tailored for Ebony's audience is proof that HC—along with other U. S. cosmetic makers (Revlon placed its first Negro publication ad in the July issue of Ebony)—is finally becoming aware of the rich market among Negro buyers.

Conservative estimates place current Negro purchases of cosmetics at around \$450 million/year—about three times what it was in 1950. This sum represents about 3% of the total spending in the U. S. by Negroes.

Most of this spending is done by Negroes in urban areas. About half of the country's Negroes live in the South in nonfarm areas; one-sixth are Southern-farm; and the remaining onethird in urban areas outside the South. Of this latter group, almost 75% are in 50 major cities.

This great geographical concentration of higher-income Negroes makes the cream of the Negro market quite easy to reach. But most cosmetic makers have shown little inclination to go after the market. Many feel that this market is covered in their overall marketing programs. Others ignore it because they think Negroes can't use their product or think the market's too small to worry about. Some think that marketing their products to Negroes might stigmatize these products in the eyes of white consumers. Others just aren't aware of the market potential-because of the paucity of material available on this subject until

Negro publications, such as the Johnson group (Ebony, Tan, Jet), Associated Publishers (Afro-American newspapers), and marketing experts,



End Spotting and Streaking with TRITON CF-10

The ability of Triton CF-10 to provide high detergency and clean rinsing is demonstrated convincingly in the above photograph. Both glasses are specimens of glassware used in our laboratories for detergency experiments. Both specimens were washed and rinsed the same way, but only the one washed with the formulation containing Triton CF-10 dried spotlessly clean.

TRITON CF-10 reduces surface tension to such a degree that it promotes thorough rinsing. It also prevents excessive foam formation, even during prolonged violent agitation.

Write today for complete data on TRITON CF-10 and its application in low foaming detergents that wash and rinse clean. TRITON is a trademark, Reg. U.S. Pat. Off. and in principal foreign countries.



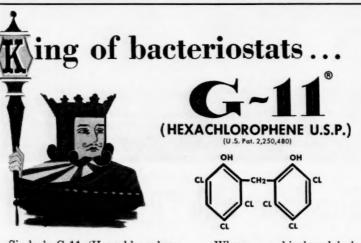
Chemicals for Industry

ROHM & HAAS

WASHINGTON SQUARE, PHILADELPHIA 5. PA.

Representatives in principal foreign countries





Sindar's G-11 (Hexachlorophene U.S.P.) now imparts bacteriostatic and deodorant properties to MORE THAN 2,000 PRODUCTS used in homes, hospitals and industries! Over 95% of America's hospitals use G-11 soaps or detergents for the surgical scrub... more consumer dollars are spent for G-11 soaps than for any other brand. In cosmetics and pharmaceuticals, too, G-11 is the chosen antiseptic.

Wherever a bisphenol is indicated, see Sindar! Write today for technical information and bulletins describing what G-11 Hexachlorophene is... and what it can do for your product.



Industrial Aromatics and Chemicals

330 West 42nd Street New York 36, N. Y.

SPECIALTIES

like BBD&O's Clarence Holte, reveal these facts about the Negro cosmetic market:

What They Use: National surveys conducted in the period 1950-56 have yielded the following data on the percent of Negroes using specific cosmetic items and the brand-preference in each case:

	%	Brand
Item	Using	Preference
Bleach Creams	14%	(Nadinola,
		Black and
		White, Apex
		and Palmers)
Cake Make-up	6.5%	(Avon, Ponds,
		Woodbury,
		Lady Esther)
Toilet Water	45.5%	(Avon,
		Evening in
		Paris,
		Tweed, Tabu)
Nail Polish	65.2%	(Revlon,
Tun Tonsii	00.2 /0	Cutex,
		Jergens,
		Avon)
Deodorant	850%	(Mum, Arrid,
Deodorant	03 70	Avon, Veto)
D	190/	
Rouge	18%	Ponds,
		,
** *		Revlon)
Hair		(D Ct
Straighteners	n.a.	(Perma Strate,
		Silky Strate,
		Kongolene)
Pressing Oils	n.a.	(Apex,
		Posners,
		C. J. Walker
		Rose Meta)
Lipstick	75%	
		Ponds,
		Avon, Coty)
Hand lotion	93%	(Jergens,
		Avon,
		Hind's, Ponds)
Face Powder	11%	(Avon, Ponds,
		Coty, Lady
		Esther)
Shampoo	59%	Liquids:
Approximately	,	Drene,
Approximately 70% of users buy liquids.		Halo,
buy nquias.		Woodbury,
		Fitch
		Creams:
		Avon,
		Fitch,
		Lustre Creme
Talcum	370	(Cashmere
Talculli	31/6	Bouquet,
		Avon,
		Evening in
		Paris,

Coty)



can with CROWN

No matter what the product . . . CROWN offers quality containers to suit your exact requirements . . . when and where you want them, to meet *your* production schedules.

Complete package design and merchandising assistance... modern lithography equipment and techniques... and experienced research and engineering service... all come with that extra touch of CROWN personal attention. Plants and offices in 18 strategic locations.

Write for your copy of CROWN's new booklet, "CROWN Art and Lithography". Crown Cork & Seal Company, Inc., Can Division, 9380 Ashton Road, Philadelphia 36, Pa.

whatever you can ... call on



CROWN CORK & SEAL COMPANY, INC.
MANUFACTURERS OF CLOSURES, CONTAINERS AND MACHINERY



MONOMERIC LIQUID WITH
97% MINIMUM ASSAY
MELTING POINT -5°C (MIN.)

ACETYL METHYL CARBINOL

(ACETOIN)

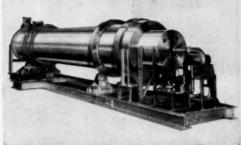
CRYSTALLINE SOLID WITH 90% MINIMUM ASSAY

WRITE FOR LATEST PRICE SCHEDULES
WAREHOUSE STOCKS CONVENIENTLY LOCATED
THROUGHOUT THE COUNTRY



WALLACE & TIERNAN INCORPORATED
BUFFALO 5, NEW YORK

3' - 6" DIAMETER × 24' - 0" LONG
"DAVENPORT" ROTARY
DRYER





DRYING AND CALCINING WELDING FLUX

After less than two years of successful operation of a "DAVENPORT" Rotary Dryer — Calciner used to process welding flux, this company has purchased their second "DAVENPORT" for this same application. Both units were supplied with automatic gas firing.

If you have a De-Watering — Drying or Cooling problem, our experienced engineers with our pilot plant can assist you with your problems. For quick reference, see Chemical Engineering 1957 catalog, or write for our Catalog B.

DAVENPORT MACHINE AND
Joundry Company
Davenport, Iowa, U.S.A.

SPECIALTIES

Item	% Using	Brand Preference
Wave Set		(Dr. Ellis,
		Bobbi,
		Vanita,
		Dr. West)
Hair Pomade	88.6%	(Vaseline,
		Dixie Peach,
		Royal Crown,
		Hindusheen)
Home		
Permanents	8%	(Toni,
		Richard
		Hudnut,
		Charm Kurl,
		Crowning
		Glory)
Toilet Soaps	99%	(Lux, Ivory,
		Palmolive,
		Camay)
Facial Creams	90%	(Ponds, Avon,
		Woodbury,
		Noxzema)



Beauty salon patrons are captive audience for cosmetic selling.

The percentage figure (14%) given for skin bleaches should be much higher, according to some, who say that many Negroes don't admit using them. The shampoo figure, on the other hand, is probably high (many Negro women have their hair shampooed and straightened every three weeks at beauty salons). Hand creams are big sellers, because of the manual nature of many Negro occupations. The trend to shorter hair among Negro men is reducing sales of hair straighteners.

It's obvious that the Negro cosmetic buyer is—except for specialty items a brandname buyer. Also, it's clear that quality products move well in this market.



SOLVAY Anhydrous ALUMINUM CHLORIDE ...in screen sizes that will fit your needs

PROPERTIES

APPEARANCE: SOLVAY Anhydrous Aluminum Chloride is a yellow crystalline solid.

Specific	ravity 25°/4°C.:
Melting I	pint (sealed tube):190°C.
Boiling p	int, 752 mm.:
Sublimati	on point:
Odor, in	ry air:None

SOLUBILITY:

tive

ven

uch

say

sing

ther

egro

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at big With proper care, about 70 parts by weight of aluminum chloride can be dissolved in 100 parts of water at 15°C. (59°F.) At higher solution temperatures decomposition occurs with the evolution of volatile chloride compounds.

																		complete
																		complete
																		soluble
																		soluble
Benzen	e										•							insoluble

Aluminum Chloride • Vinyl Chloride • Para-dichlorobenzene Calcium Chloride • Potassium Carbonate • Monochlorobenzene Sodium Nitrite • Caustic Potash • Caustic Soda • Soda Sah Snowfiake® Crystals • Ortho-dichlorobenzene • Chloroform Ammonium Chloride • Sodium Bicarbonate • Methyl Chloride Ammonium Chloride • Cleaning Compounds • Chloride Methylene Chloride • Hydrogen Peroxide • Carbon Tetrachloride

This high purity material—available in varied screen sizes—is highly effective as an alkylation catalyst used in producing styrene, synthetic detergents, high octane aviation gas. Makers of ethyl chloride and butyl rubber also value its catalytic action.

Other applications occur in such diversified fields as insecticides, pharmaceuticals, phenol, synthetic resins, petroleum cracking, dyestuffs and intermediates.

How can you apply it?
Mail coupon for sample, data!





SOLVAY PROCESS DIVISION

ALLIED CHEMICAL & DYE CORPORATION
61 Broadway, New York 6, N. Y.

Please send me without cost the following Solvay Anhydrous Aluminum Chloride items:

Tost sample	T Titoroture
☐ Test sample	☐ Literature

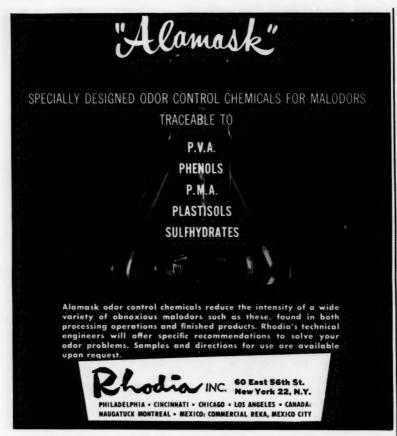
Name____

Position______
Company_____

Phone____

Address______State

Zone___State____



Chloromethanes

- . METHYLENE CHLORIDE .
- CHLOROFORM USP AND TECHNICAL
- CARBON TETRACHLORIDE

· GRAIN FUMIGANTS

Add the name of Frontier to your list of chloromethanes producers — and gain a new source with much to offer you. Swift shipments from the heart of Mid-America . . . high quality from a new planf with advanced processing and control equipment. Friendly, personal service — from a firm big enough to deliver the best, and young enough to appreciate your business. We shall welcome your inquiry.

now being delivered from Frontier's plant at Wichita, Kansas...



by the curtout

by the truckload

and in drum lots

Basic Producers of

CHLOROMETHANES

BHC (14 and 36 gamma)

CHLORINE

CAUSTIC SODA MURIATIC ACID

FINE GRAIN SALT

EXECUTIVE OFFICES,
Wichita, Kansas
PLANTS:
Wichita, Kansas
Denver City, Texas

A DIVISION OF UNION CHEMICAL & MATERIALS CORP.

SPECIALTIES

The preference for national brands stems from the Negroes' strong dependence on imitative buying. This also accounts, in large measure, for the quality-oriented, rather than price-oriented, nature of Negro buying. There's this, too: Negroes have, in the past, been sold a lot of shoddy goods, now often buy the best to be on the safe side.

Even more important is the factor



Products for the hair are biggest item in Negro cosmetic field.

of prestige. The Negro buys the best to "feel equal to the white," as one Negro businessman puts it. Face cream isn't just something to put on the face; it's a social symbol.

In the Neighborhood: National surveys indicate that the Negro cosmetic customer usually patronizes (in this order) neighborhood drug stores (52% of the purchases made here), department stores (20%), beauty parlors (16%), house-to-house dealers (7%), variety stores (3%) and supermarkets (3%). BBD&O's most recent record (1953) of cosmetic purchases in Memphis, Tenn., shows:*

• House-to-house and drugstore outlets accounted for 44% of the Negro purchases of face powder; 61.1% of lipsticks; 52.2% of hand lotions; 49.4% of deodorants; 77.3% of shampoos and 61% of face creams.

• Grocery stores made 0.5% of face powder sales; 4.2% of lipstick sales; 8.3%, hand lotions; 15.7%, deodorants; 8.7%, shampoos; 8.8%, face creams.

POINT OF SALE...

FOR CHEM SHOW EXHIBITORS

Be sure...talk business first to the men who make yours...in Chemical Week's new, exclusive November 30th Chem Show Report

WHEN YOU'RE EXHIBITING you want assurance in advance you'll draw top-grade CPI buying powers. That means management (51% of '55 Show-goers were process executives) . . . and this, in turn, means CHEMICAL WEEK — the magazine that serves CPI bossmen in all functions, at all levels. And here's why CW's Chem Show Report can guarantee the right kind of booth traffic for you . . .

YOU WANT CLASS — NOT MASS! Let's face it . . . everybody's got a "Special Show Issue" or "Program" of some kind. So what makes us so different? First place, this is neither! The "Chem Show Report" is an issue within the regular issue . . . a distinctive insert 1/8" less in trim size . . so bound it can be removed instantly and intact from the rest of the magazine. First page of insert uses CW cover format . . . but illustration and copy is exclusively on the Show. So's the entire editorial content . . with advertising of exhibitors only . . . at regular space rates.

CW MAKES IT EASY for you to flag down prospects here. The unique package compels busy management's attention . . . it has everything a "Show Program" can offer and more . . . the whole theme's pitched on "What to look for at the Show" before it opens. Distribution is to entire CHEMICAL WEEK circulation (36,000 total net paid by issue date) . . . plus 10,000 additional, to a select group of management buyers on the Convention floor. So why wait? See your CW man right now—Get that reservation in right now for the . . .

'Chem Show Report" of ...



(Published November 30 . . .

Closing November 13, 1957)



POLYESTER F-1

A modified glycol-polyadipate specifically designed for reaction with diisocyanates to produce . . .

POLYURETHANE flexible foams & films

SPECIFICATIONS

Acid Number Hydroxyl Number Viscosity, cps. @ 25°C. Color, Gardner

Color, Gardner Sp. Gr., 20/20°C. Moisture, % 1.5 Maximum 58-62

10,000-13,000 5 Maximum 1.195 ± 0.005 0.0 Evaluate RC POLYESTER F-1 in POLYURETHANE cushioning, coatings, thermal insulation, toys, sponges, jacket-liners, carpet underlays, automotive padding, rubber lacquers, wire insulation, and in hundreds of additional applications!

WRITE TODAY! Ask for our technical data sheet on RC POLYESTER F-1. We'll be glad to send you samples!

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SPECIALTIES

- Department stores accounted for 17.8% of face powder sales; 27.8%, lipsticks; 15%, hand lotions; 12.3%, deodorants; 7.6%, shampoos; 11%, face creams.
- Variety stores rang up 38.6% of face powder sales; 6.8%, lipsticks; 24.5%, hand lotion; 22.6%, deodorant; 6.4%, shampoos; 19.2%, face creams

Of these outlets providing the Negro with cosmetics, department stores and the house-to-house sellers seem to have the greatest growth potential. The downtown department store is often close to areas of dense Negro population, and the house-to-house seller can provide—in the privacy of the home—advice on the special problems of a buying group that is becoming more demanding of its cosmetics.

Leading firms specializing in houseto-house selling are Avon Products (New York), which is reported to get 25% of its cosmetic sales dollar from the Negro; Fuller Products Co. (Chicago), and Watkins Products.

Added Stature: Cosmetic manufacturers will find that distributors specializing in selling Negro cosmetics have grown in number and financial stature each year. There are currently some 217 distributors of this sort, generally white-owned and operated. Among the larger are Wingate (Philadelphia); I. Posner, and Summey (both New York); L. Blankenship Co. (Kansas City); Bronner Bros. (Atlanta); C. A. Howell (Detroit), and L. & M. Beauty Supply (Los Angeles).

Since most stores which sell cosmetics to Negroes are operated by whites (with the exception of beauty parlors), few of these distributors use Negro salesmen.

America's 17 million Negroes, with a buying power of \$18 billion, present a lucrative market for the company taking the trouble to investigate their buying habits, needs, and desires. Three that have—Avon, Coty and Revlon—are now said to take nearly 20% of the entire Negro cosmetic market. They've shown that the return can repay the extra effort required.

*This same study indicates that while Negros constitute only 39% of the population, they account for 63.4% of the sales of deodrants; 54.8%, face powder; 54.5%, hand lotion; 50.8%, face cream; 34.5%, lipstick; 20.8% of the shampoos.

54.8%, face powder; 54.5%, hand lotion; 50.8%, face cream; 34.5%, lipstick; 20.8% of the shampoos.

Another one-city survey, by the *Chicago Defender* of 625 of its readers, shows that chain stores sell 43.3% of cosmetics; department stores, 22.4%; house-to-house salesmen, 16.8%; variety stores, 13%; independent drug, 6.7%, beauty shops, 6.2%; grocery stores, 2.2%; mail order, 0.5%.

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IN CANADA: Standard Chemical Limited and



At National Agricultural Chemicals Assn's shoreside meeting, members ponder future.

PHOTOS-LIONEL CI

Long View's Bright for Ag Chemicals Men



At the sedate New Jersey shore resort of Spring Lake last week, 500 farm-chemicals makers heard some-optimistic business predictions.

Offering the encouraging word to members of the National Agricultural Chemicals Assn. was economist Vergil Reed, vice-president of J. Walter Thompson. Reed linked a rising market for pesticides with the demand for increased farm productivity—estimates are that 1975's crop requirements will be 85% over the '50 farm output. He pointed out that "total incomes . . . on farms have been and still are increasing."

It's Reed's contention that the farm-chemicals maker and marketer stand to gain as farming becomes a commercial undertaking rather than a way of living—a change evidenced by the shrinking number of farms: 4.8 million in 1956, compared with 5.7 million in 1900. Of these, 3.3 million are commercial farms, account

Bohlen and Beal show how farmer gets new ideas.

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Selling Opportunities Offered

Excellent sales opportunity for technically trained young man to join well-established aggressive firm manufacturing industrial chemicals and specialties in Northern New Jersey. Liberal company benefits. Salary open. Send details resume. RW-6102, Chemical Week.

Sales Representative for Petrochemicals. Major oil company. College degree with chemical basic ground preferred. Sales experience and familiarity with anionic and nonionic detergents, ethylene oxide and derivatives, plasticizers and other petro-chemical products would be plus factor. Replies confidential. RW-6154, Chemical Week.

Selling Opportunities Wanted

Old established highly reputable chemical soles company with main office in New York City is open to represent one more account. Write RA-5732, Chemical Week.

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Sharples C-20 Super-D-Hydrator Centrifugal T-316 Stainless steel contact parts. 20-hp motor, controls. Albert Bramer Assoc's., 818 Olive St., St. Louis 1, Mo.

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For Sale—A. T. & M. suspended-type centrifugal, 40" x 24", practically new. FS-6159, Chemical Week.

For Sale—Shriver 36" aluminum filter, 33 chambers, used a few weeks only, immediate delivery, real bargain. FS-6162, Chemical Week.

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For Sale—"U.S. Bottlers" combination Loadomatic unscrambler and rinser, Style US-17, cap. up to 300 bpm, reconditioned. FS-6169, Chemical Week.

Yeast Dryer—Fisher rotary yeast dryer, Model 36/40, with pulverizers, elevator, still erected in plant in Eastern Pennsylvania, complete details by writing. FS-6172, Chemical Week.

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Between sessions, informal discussion continues on porch.

for 97% of the value (\$30.2 billion a year) of farm products sold. And 70% of these commercial farms buy fertilizers.

Sell Ideas: The farmer has the need and the money, but how do you get him to buy? Joe Bohlen and George Beal, Iowa State College agricultural market experts, answered that question with a catchy dialogue and with the aid of a giant flannelboard. Their conclusion: mass media are the farmer's best source of new information; the salesman is relatively unimportant in this regard.

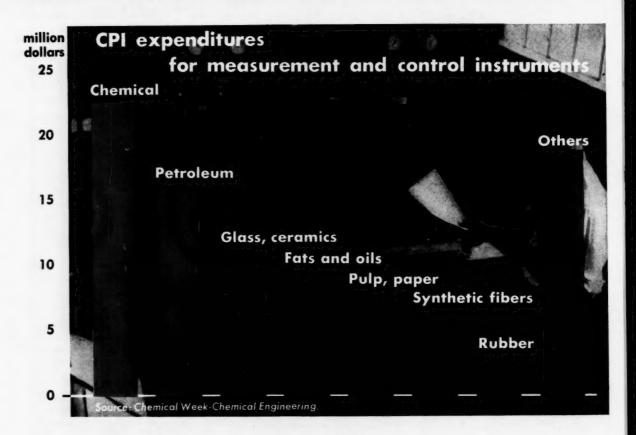
In regular business sessions, NACA added three new members to its board of directors and installed new association officers.

Jackson Vernon (Niagara Chemical Division), new president, and Charles Sommer, Jr. (Monsanto), new vicepresident, handled NACA's final session at Spring Lake.



No day too busy for brief visit to beach by members and wives.

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How CPI Splits the Tab for Instruments

An exhaustive survey shows that last year the chemical process industries spent a whacking \$94.2 million for direct purchases of measuring and control instruments.

The chemical industry led by a wide margin in total dollars spent in this category, paid out an impressive \$22.6 million. Here's where the great bulk of this money went:

- Various temperature instruments accounted for some \$9.5 million.
 - Pressure instruments—\$6.4 million.
 - Flow meters-about \$3 million.
- Weighing and proportioning mechanisms—about \$2.8 million.

The petroleum refining industry, also a big buyer of instruments, spent some \$16 million last year; \$6.8 million of this total were paid out for temperature instruments.

The glass and ceramic industry ranked third in expenditures—close to \$11 million. Here again, temperature instruments accounted for the largest share of costs—some \$5.4 million.

Fats and oils and pulp and paper industries spent approximately \$9.2 million and \$7.6 million, respectively.

Synthetic fiber firms' tab for measurement and control instruments totaled \$6.4 million; the rubber industry spent nearly \$3 million.

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Chromium Nitrate, Crystal, Purified	DA-35801
Chromium Nitrate, Solution, Technical	DA-49711
Chromium Potassium Fluoride, Purified	DA-35791
Chromium Potassium Sulfate, Granular, Photo	DA-35841
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Cupric Nitrate, Crystal, Purified	DA-36421
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Nickelous Nitrate, Crystal, Purified	DA-40271
Oxamide, Purified	DA-48651
Potassium Acetate, N.F., Crystal, Technical	DA-40821
Potassium Bifluoride, Technical	DA-41461
Potassium Borate, Tetra, Purified	DA-40771
Potassium Cyanate, Powder, Purified	DA-41591
Potassium Cyanate, Powder, Technical	DA-48821
Potassium Fluoride, Anhydrous, Purified	DA-40911
Potassium Fluoride, Crystal, Purified	DA-41041
Potassium Fluoborate, Crystal, Technical	DA-41361
Potassium Nitrite, Fused, Lump	DA-85521
Potassium Thiosulfate, Purified	DA-41521
Potassium Titanium Fluoride	DA-40722
Selenium Metal, Powder, Se	DA-48011
Sodium Fluoborate, Crystal, Technical	DA-42401
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